Installation Restoration Program (IRP)
Final Remedial Investigation Report
for IRP Sites Nos. 4, 5, 7, and 14

152nd Tactical Reconnaissance Group
(Currently the 152nd Airlift Wing)
Nevada Air National Guard
Reno Tahoe International Airport
Reno, Nevada

AD-A286 880



January 1996



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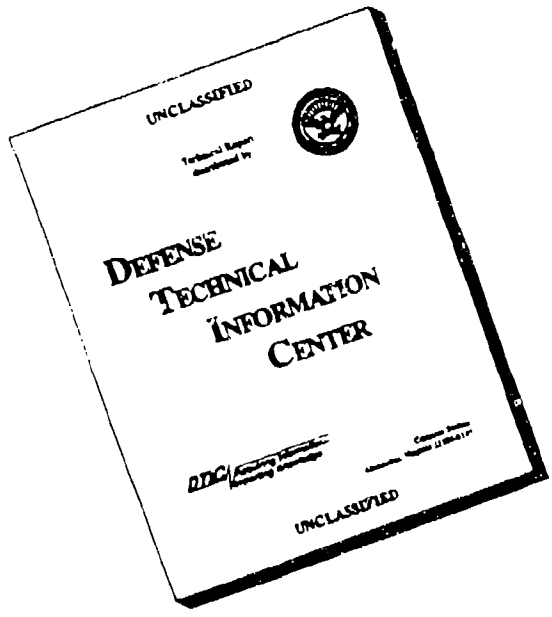


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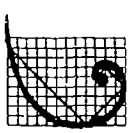
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Prepared For:

HQ/ANG/CEVR
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LIST OF ACRONYMS

Acronym	Definition
1,2,4-TCB	1,2,4-trichlorobenzene
1,2-DCE	1,2-dichloroethylene
1,4-DCB	1,4-dichlorobenzene
AAWC	Airport Authority of Washoe County
AGE	Aerospace Ground Equipment
ANG/CEVR	Air National Guard/Civil Engineering Environmental Restoration Group
ARARs	Applicable or Relevant and Appropriate Requirements
ASG	Automated Sciences Group, Inc.
ASTM	American Standard for Testing and Materials
AWQC	Ambient Water Quality Criteria
bgs	below ground surface
BTEX	benzene, toluene, ethylene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-dichloroethylene
DD	decision document
DERP	Defense of Environmental Restoration Program
DoD	Department of Defense
EPA	United States Environmental Protection Agency
ERM	ERM-West, Inc.
FTA	Fire Training Area
GC	gas chromatograph
H	Henry's law constant
HAZWRAP	Hazardous Waste Remedial Actions Program
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
Koc	organic carbon/water partition coefficient
LTM	long-term monitoring
MCLGs	maximum contaminant level goals
MCLs	maximum contaminant levels
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
NDCNR	Nevada Department of Conservation and Natural Resources
NDEP	Nevada Division of Environmental Protection
NFA	no further action
NPDES	National Pollutant Discharge Elimination System
NVANG	Nevada Air National Guard

LIST OF ACRONYMS

Acronym	Definition
OD	outer diameter
OpTech	Operational Technologies Corporation
ORNL/ETS	Oak Ridge National Laboratory/Environmental Technology Section
OSHA	Occupational Safety and Health Act
OWS	oil water separator
PA	preliminary Assessment
PAH	polynuclear aromatic hydrocarbon
PCE	tetrachloroethylene
PEER	PEER Consultants
PID	photoionization detector
POL	petroleum, oil, and lubricants
QA/QC	Quality Assurance/Quality Control
RA	remedial action
RCRIS	Resource Conservation and Recovery Information System
RD	remedial design
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SVOC	semivolatile organic compound
TCE	trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
trans-1,2-DCE	trans-1,2-dichloroethylene
TSD	treatment, storage, or disposal
UST	underground storage tank
VOC	volatile organic compound
µg/kg	micrograms per kilogram
µg/l	micrograms per liter
µg/mg	micrograms per milligram
µl	microliters

EXECUTIVE SUMMARY

ERM-West, Inc., (ERM) conducted a Remedial Investigation (RI) at the Nevada Air National Guard (NVANG) Base in Reno, Nevada. The RI is part of the Installation Restoration Program, which is designed to investigate and remediate potentially contaminated sites on Air National Guard property.

The NVANG Base is located at the Reno Tahoe International Airport complex, approximately 5 miles southeast of downtown Reno, Nevada. The Base presently occupies approximately 60 acres of land adjacent to the northwest quadrant of the airport complex. During finalization of the RI Report, the NVANG Base underwent a change in mission and currently houses the 152nd Airlift Wing. Throughout the text, tables, and illustrations in this document, the NVANG Base is referred to using the name of its former mission (152nd Tactical Reconnaissance Group).

A Site Investigation (SI) was conducted at the NVANG Base by Oak Ridge National Laboratory/Environmental Technology Section. The results of the SI, reported in April 1994, recommended that an RI be performed at four sites at the Base: Sites 4 and 5 [Former Fire Training Areas (FTA)]; Site 7 [Petroleum, Oil, and Lubricants Storage Area(POL)]; and Site 14 [Oil Water Separator (OWS)].

ERM drilled 34 soil borings during the course of the RI field work. A total of 9 monitoring wells were also installed as part of the RI field activities. Review of data collected during both the RI and SI drilling activities suggests that the near-surface geology consists of lacustrine silty clay underlain by alluvial sand and gravel. Shallow ground water was encountered throughout the base in a semi-confined aquifer. Ground water flows toward the east or southeast at the NVANG Base.

Results of chemical analysis of soil and ground water samples collected during both the RI and SI indicates that petroleum hydrocarbons (JP-4 fuel and component compounds) have impacted both soil and ground water at the Base. Additionally, the RI identified two limited areas of ground water impacted by trichloroethylene (TCE).

Site-specific findings and recommendations based on the RI are summarized below.

Site 4 - Former Fire Training Area

An area of soil was identified in which total petroleum hydrocarbons (TPH), 1,2,4-trichlorobenzene, and 1,4-dichlorobenzene exceeded cleanup goals. In general, this area is relatively small and is located immediately upgradient from monitoring well MW05. The area of petroleum-impacted soil potentially provides a continuing source of petroleum hydrocarbons and volatile organic compounds to ground water.

An area of ground water was identified that contained TCE and benzene concentrations equal to or exceeding their respective cleanup standards. Benzene was detected at a maximum concentration of 23 micrograms per liter (µg/l) and its cleanup standard is 5 µg/l. TCE was detected at a maximum concentration of 12 µg/l and its cleanup standard is 5 µg/l. The area of benzene and TCE contamination in ground water is also confined to the immediate vicinity of monitoring well MW05. A comparison of concentrations of these compounds in samples collected in March 1992 and July 1995 suggest that significant decreases have occurred.

The following recommendations were made based on the results of the RI:

- Long-term ground water monitoring should be performed at the site, based on the limited extent of ground water affected and based on the current declining concentration trend for TCE and benzene.
- A Feasibility Study should be performed to evaluate remedial alternatives for soil.

Site 5 - Former Fire Training Area

An area of TPH-impacted soil was identified in the immediate vicinity of monitoring well MW17. The impacted soil provides a continuing source of petroleum-derived hydrocarbons to ground water at the site. This soil area lies partially on Airport property and partially on the NVANG Base.

Benzene exceeds cleanup standards in ground water samples collected from monitoring well MW17. The maximum concentration of benzene detected in samples collected from this monitoring well was 14 µg/l. The cleanup standard for benzene is 5 µg/l. Review of additional data for the site suggests that benzene-impacted ground water is confined to the immediate vicinity of monitoring well MW17. A portion of this area of benzene-impacted ground water also probably

extends off Base. A comparison of concentrations of these compounds in samples collected in March 1992 and May 1995 suggests that no significant concentration changes have occurred.

Based on review of RI data, it was recommended that an FS be performed to evaluate remedial alternatives for soil and ground water at this site.

Site 7 - Petroleum, Oil, and Lubricants Storage Area

An area of petroleum-impacted soil was identified at this site. Review of the areal and vertical distributions of TPH, benzene, and other fuel component compounds suggests that the complex distribution of impacted soil is consistent with the product release history at the site. The existence of petroleum-impacted soil at the site poses a potential threat to ground water quality.

Approximately 13,500 gallons of floating JP-4 fuel (floating product) was discovered within the gravel backfill surrounding existing underground storage tanks. Product removal operations were implemented in late August 1995 through early September, during which approximately 10,000 gallons of product was removed. One additional area of free product exists at Site 7 - POL Storage Area in the vicinity of product monitoring well T-4. This discrete area of floating product is likely associated with a surface spill event. Existence of floating product at the site poses a threat to ground water quality.

An area of ground water was identified that contained benzene and bis(2-ethylhexyl)phthalate exceeding their respective cleanup standards. Benzene was detected at a maximum concentration of 1,300 µg/l and its cleanup standard is 5 µg/l. Bis(2-ethylhexyl)phthalate was detected at a maximum concentration of 1,700 µg/l and its cleanup standard is 6 µg/l. The area of ground water impacted by benzene may extend off Base. However, it is not anticipated that the benzene-impacted ground water extends a significant distance south of the Base fence line, based on review of the on-Base benzene distribution.

Based on review of RI data, it was recommended that an FS be performed to evaluate remedial alternatives for further product removal and for soil and ground water at this site.

Site 14 - Oil Water Separator

TPH in soils exceed cleanup standards in an area of soil at Site 14 - OWS. The distribution of the TPH-impacted soil is consistent with the

release history at Site 14 - OWS. The absence of significant volatile organic compounds in the impacted area suggests that in situ degradation of the spilled fuel has occurred. The remaining semivolatile components of JP-4 fuel have low solubility, inhibiting their transport to ground water.

It does not appear that TPH-impacted soils currently provide a significant source of fuel-related hydrocarbons to ground water. Ground water data collected during the SI and the RI suggest that minor concentrations of fuel-related hydrocarbons have been transported to ground water.

Long-term monitoring should be performed at Site 14 - OWS ground water to detect the possibility of future problems.

SECTION 1.0

INTRODUCTION

ERM-West, Inc., (ERM) has prepared this report for the Remedial Investigation (RI) conducted at the Nevada Air National Guard (NVANG) Base in Reno, Nevada. The RI is part of the Installation Restoration Program (IRP) of the Air National Guard, and was performed under contract DAHA90-94-0014 between ERM and the National Guard Bureau, Department of the Army and the Air Force. The Air National Guard/Civil Engineering Environmental Restoration Group (ANG/CEVR) provided technical and project management oversight for this investigation on behalf of the ANG/CEVR.

The RI report follows the recommended ANG/CEVR format and contains the basic contents suggested in the United States Environmental Protection Agency (EPA) document *Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA (EPA, 1988).*

A description of planned activities performed during this RI is included in ERM's RI/Feasibility Study (FS) Workplan (ERM, 1995b). Field activities for the RI were performed during May 1995. The objectives of this RI report are to: 1) summarize the activities and present the results of the soil and ground water investigations conducted at IRP Sites 4 [Former Fire Training Area (FTA)] , 5 (Former FTA), 7 [Petroleum, Oil, and Lubricants (POL) Storage Area], and 14 [Oil Water Separator (OWS)] at the NVANG Base; 2) determine the nature and extent of contamination at the IRP sites; and 3) provide recommendations for response actions. This introduction includes the following subsections:

- Site background information; and
- IRP information.

1.1 Site Background Information

The NVANG Base is located at the Reno-Tahoe International Airport complex, approximately 5 miles southeast of downtown Reno, Nevada

(Figure 1-1). During finalization of the RI Report, the NVANG Base underwent a change in mission and currently houses the 152nd Airlift Wing. Throughout the text, tables, and illustrations in this document, the NVANG Base is referred to using the name of its former mission (152nd Tactical Reconnaissance Group).

The Base presently occupies approximately 60 acres of land adjacent to the airport complex.

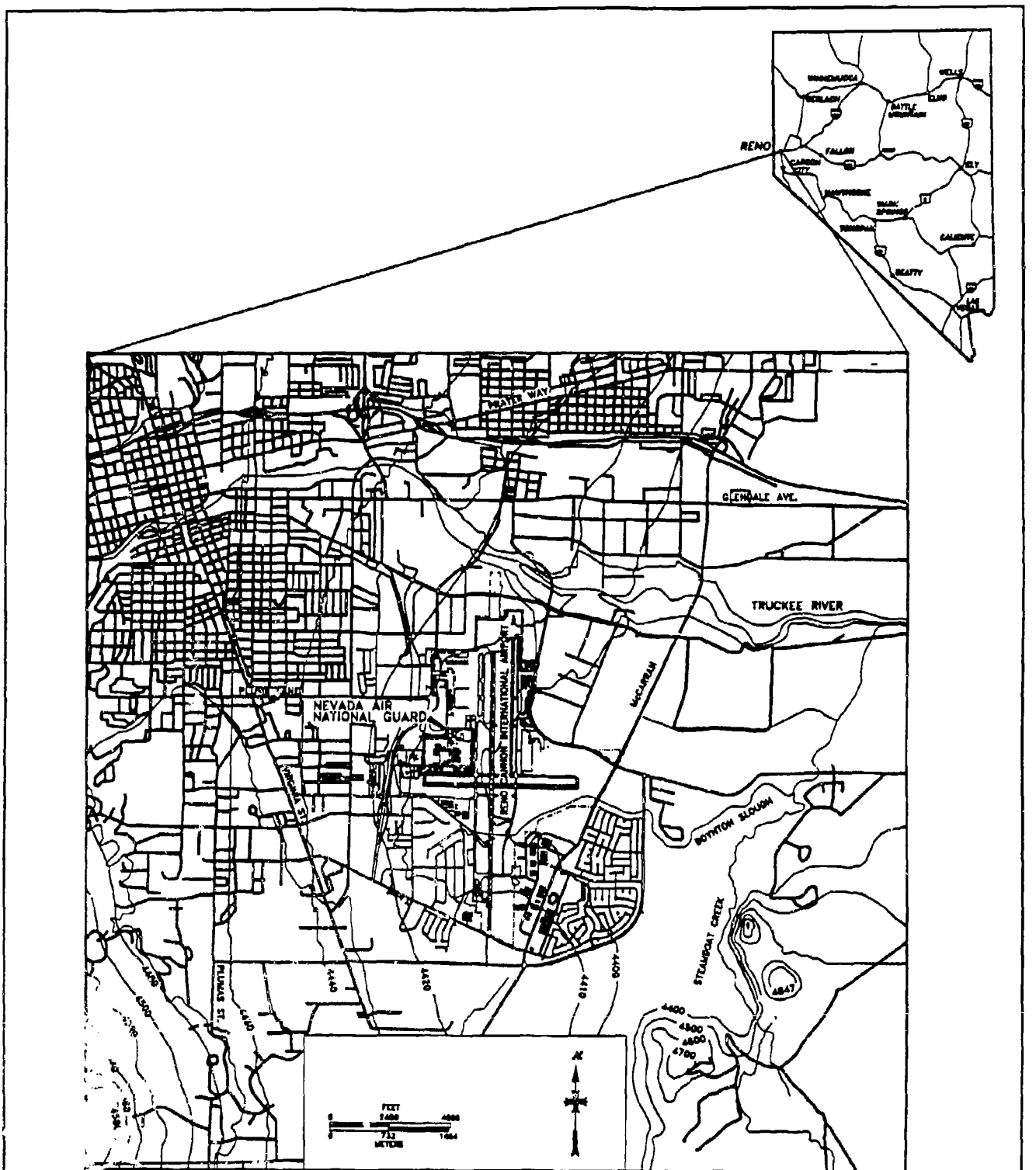
Previous IRP investigations have been performed at the NVANG Base. These investigations have included the following:

- Preliminary Assessment (PA) record search performed in 1988 by Automated Sciences Group, Inc. (ASG);
- Site Assessment performed in 1991 by PEER Consultants (PEER);
- Site Investigation (SI) performed in 1992 through 1993 by Oak Ridge National Laboratory/Environmental Technology Section (ORNL/ETS); and
- SI performed at Site 12 - Aircraft Parking Apron Area in 1993 through 1994 by Operational Technologies Corporation (OpTech).

The ORNL/ETS SI confirmed the presence of soil and ground water contamination at four sites at the NVANG Base. The sites identified were sites 4, 5, 7, and 14. The SI recommended that an RI/FS be conducted. Background information regarding previous investigations at the four study sites is provided in Sections 2.1 and 2.2 of this report.

1.2 Installation Restoration Program (IRP) Information

The Defense Environmental Restoration Program (DERP) was established in 1984 to promote and coordinate efforts for the evaluation and cleanup of contamination at Department of Defense (DoD) installations. On January 23, 1987, Presidential Executive Order 12580 was issued which assigned the responsibility for carrying out DERP within the overall framework of the Superfund Amendments and Reauthorization Act (SARA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) to the Secretary of Defense. The IRP was established under DERP to identify, investigate, and remediate contamination at installations. The IRP focuses on cleanup of contamination associated with past DoD activities to ensure that threats to public health are eliminated and to restore natural resources for future use.



SOURCE: ORNL/ETS, 1994

FIGURE 1-1

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LOCATION MAP OF
NEVADA AIR NATIONAL GUARD BASE
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

The IRP is divided into six phases as illustrated in Figure 1-2. These phases are defined and described in the following subsections.

1.2.1 Preliminary Assessment (PA)

The PA process consists of personnel interviews, a record search, and site inspection designed to identify and evaluate past disposal and/or spill sites that might pose a potential or actual hazard to public health, public welfare, or the environment. Previously undocumented information is obtained through the interviews. The record search focuses on obtaining useful information from: aerial photographs, installation plans; facility inventory documents; lists of hazardous materials used; subcontractor reports; correspondence; Material Safety Data Sheets; federal/state agency scientific reports on endangered and threatened species; and critical habitats, documents from local government offices, and numerous standard reference sources.

1.2.2 Site Investigation (SI)

The SI phase consists of field activities designed to confirm the presence or absence of contamination at the sites identified and to determine potential risks to human health and the environment. The activities undertaken during the SI generally fall into three distinct categories: screening, confirmation, and optional activities. Screening activities are conducted to gather preliminary data on each site. Confirmation activities include specific media sampling and laboratory analysis to confirm either the presence or the absence of contamination, chemical concentrations, and the potential for migration of contaminants. Information obtained during the subsurface investigation is also utilized to define the installation and site hydrology, geology, and soil characteristics. Additional data may be needed to reach a decision point for a site, such as no further IRP action warranted, prompt removal of contaminants is necessitated, or further IRP work is required.

The general approach for the design of the SI is to sequence the field activities so that data are acquired and used as the field investigation progresses. This is done in order to determine the absence or presence of contamination in a relatively short period of time, optimize data collection and data quality, and keep costs to a minimum.

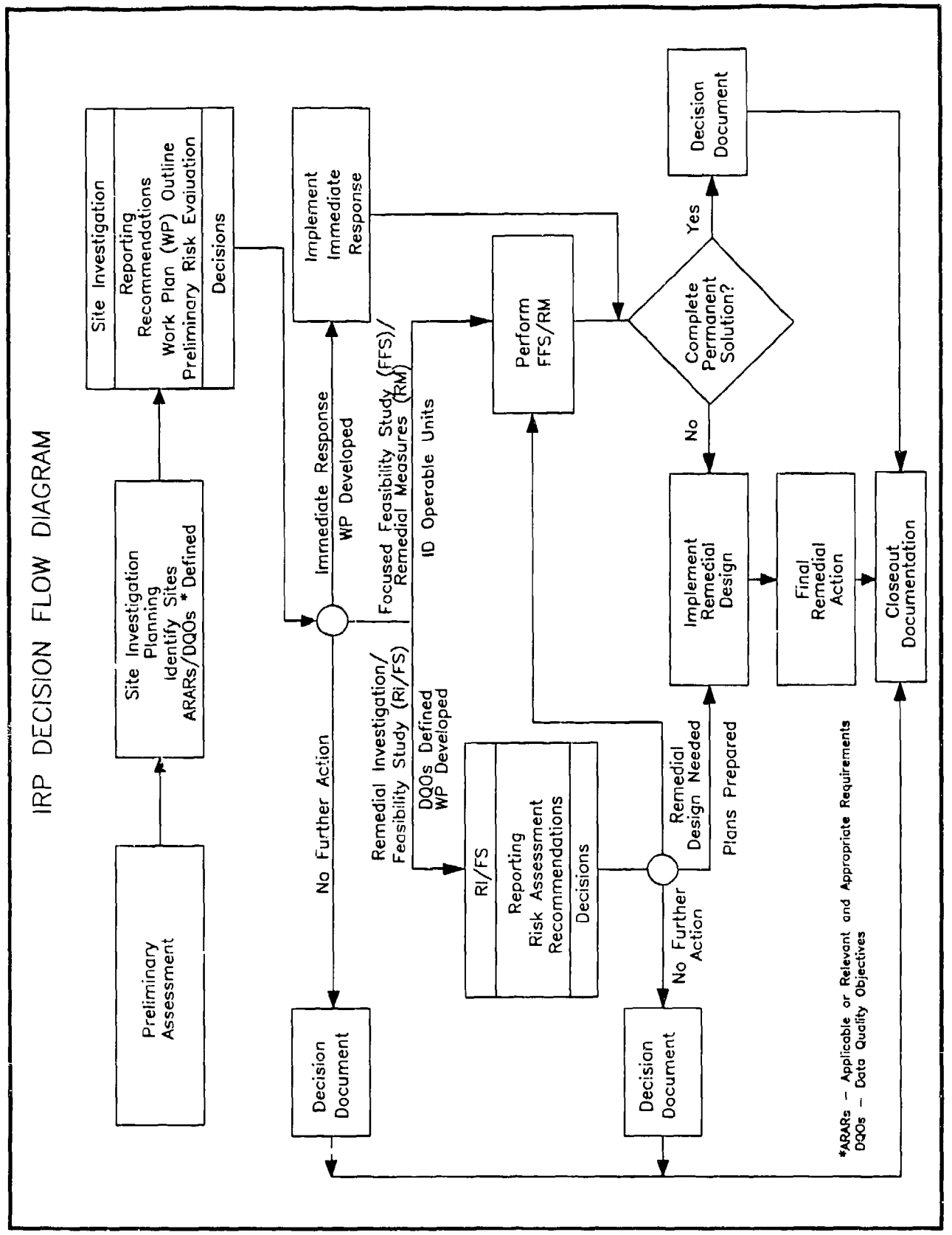


FIGURE 1-2

INSTALLATION RESTORATION PROGRAM

DECISION FLOW DIAGRAM

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1.2.3 Remedial Investigation (RI)

The objectives of the RI are to determine the nature and extent of contamination at a site, determine the nature and extent of potential threats to human health and the environment, and provide a basis for determining the types of response actions to be considered [decision document (DD), FS, remedial design (RD), or remedial action (RA)].

The RI consists of field activities designed to quantify the potential contaminant, the extent of the contamination, and the pathways of contaminant migration. Field activities may include the installation of soil borings and/or monitoring wells and the collection and analysis of water, soil, and/or sediment samples. Careful documentation and quality control procedures are implemented during RI field activities in accordance with CERCLA/SARA guidelines which ensure the validity of data.

Hydrogeologic studies are conducted to determine the underlying strata, ground water flow rates, and direction of contaminant migration.

A baseline risk assessment, which provides an evaluation of the potential threat to human health, is conducted prior to implementing any RA. The risk assessment provides the basis for determining whether RA is necessary to mitigate endangerment to public health or the environment.

The findings from this study result in the selection of one of the following options:

- No Further Action (NFA): The results of investigations do not indicate harmful concentrations of chemicals that pose a significant threat to human health or the environment. Therefore, no further IRP action is warranted and a DD will be prepared to close the site.

- Long-Term Monitoring (LTM): The results of investigations do not indicate the presence of sufficient contamination to justify costly remedial action. LTM may be recommended to detect the possibility of future problems.

- FS: The results of investigations confirm the presence of contamination that may pose a threat to human health and/or the environment, and some sort of remedial action is indicated. The FS is described fully in the following subsection.

1.2.4 Feasibility Study (FS)

Based on results of the RI, the baseline risk assessment, and a review of state and federal regulatory requirements, an FS will be prepared to develop, screen, and evaluate alternatives for remediation of ground water and/or soil contamination at the site. The overall objectives of the FS include providing information necessary for remedial alternative development and evaluating information to support selection of a remedy that is protective of human health and the environment; considering applicable or relevant and appropriate requirements; satisfying the preference for treatment that significantly and permanently reduces toxicity, mobility, or volume of hazardous constituents as a principal element; and cost-effectiveness.

Activities associated with the FS include the following:

- Development of alternatives;
- Preliminary screening of alternatives;
- Detailed analysis of alternatives;
- Comparative analysis of alternatives; and
- Completion of an FS report.

The end result of the FS is the selection of the most appropriate remedial action with concurrence by state and/or federal regulatory agencies.

1.2.5 Remedial Design (RD)

The RD involves formulation and approval of the engineering designs required to implement the selected remedial action identified in the FS.

1.2.6 Remedial Action (RA)

The RA is the actual implementation of the remedial alternative. It refers to the accomplishment of measures to eliminate the hazard or, at a minimum, reduce it to an acceptable limit. Covering a landfill with an impermeable cap, pumping and treating contaminated ground water, installing a new water distribution system, and *in situ* biodegradation of contaminated soils are examples of remedial measures that might be selected. In some cases, after the RAs have

been completed, a LTM system may be installed as a precautionary measure to detect contaminant migration or to document the efficiency of remediation.

1.2.7 Immediate Action Alternatives

At any point, it may be determined that a site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminants. Immediate action, such as limiting access to the site, capping or removing contaminated soils, and/or providing an alternative water supply may suffice as effective control measures. Sites requiring immediate removal action maintain IRP status in order to determine the need for additional remedial planning or LTM. Removal measures or other appropriate remedial actions may be implemented during any phase of an IRP project.

SECTION 2.0

SITE BACKGROUND INFORMATION

This section of the RI Report includes the following:

- Site description;
- Summary of previous investigations at the NVANG Base; and
- Site descriptions for IRP sites 4, 5, 7, and 14.

Information presented in this section was derived primarily from ORNL/ETS's report entitled *Site Investigation Report, 152nd Tactical Reconnaissance Group, Nevada Air National Guard, Reno Cannon International Airport, Reno, Nevada (April 1994).* This information has been updated by ERM based on the RI findings.

2.1 Site Description

The Reno Tahoe International Airport complex is located approximately 5 miles southeast of downtown Reno, Nevada. The Base presently occupies approximately 60 acres of land in the southern portion of the northwest quadrant of the airport complex and employs 1,136 military personnel, of which 287 are full-time employees (ASG, 1989).

2.1.1 Base History

In April 1948, the Base was established as the 192nd Fighter Squadron. This designation was changed to the 192nd Fighter Bomber Squadron in April 1951. The unit was redesignated as the 192nd Fighter Interceptor Squadron in June 1955 and retained this designation until April 1958, when the unit was renamed the 152nd Fighter Group. In February 1961, the 152nd Fighter Group acquired its present designation, the 152nd Reconnaissance Group (ASG, 1989).

Initially, the Base was equipped with P-51 aircraft and was located at the Stead Army Air Base in Reno, Nevada. In 1953, the Base leased 29 acres of land at Hubbard Field (Reno Tahoe International Airport) from the City of Reno. Base operations were moved from Stead Army Air Base

to their present location in 1954. F-86A aircraft were assigned to the Base from 1956 until 1961 when the group converted to the RB-57 aircraft. In 1965, the Base converted to RF-101 aircraft which were flown until 1975 when the Base converted to the RF-4Cs presently being operated at the Base (ASG, 1989).

2.1.2 Adjacent Land Use

The land use to the south and west of the Base is industrial and residential. Immediately east and north of the Base is the Reno-Tahoe International Airport.

2.1.3 Waste Disposal Practices and Past Environmental Problems

The following subsections describe the hazardous materials/wastes generated, disposal practices, and past environmental incidents and problems at the NVANG Base.

2.1.3.1 Wastes Generated by Base Operations. As part of the PA of the Base, ASG reviewed base records and conducted interviews with past and present Base employees to identify specific operations where chemicals are handled and hazardous materials/wastes are generated (ASG, 1989). The major operations of the Base that have used and disposed of hazardous materials/wastes include aircraft maintenance; aerospace ground equipment maintenance; ground vehicle maintenance; petroleum, oil, and lubricant (POL) management and distribution; and air weapons control. These operations involve such activities as corrosion control, nondestructive inspection, fuel cell maintenance, engine maintenance, hydraulics, structural repair, and wheel and tire maintenance. Motor oil, engine oil, turbine oil, hydraulic fluid, recovered fuels, paint wastes, spent cleaners, acids, strippers, and solvents are generated and disposed of by the activities listed above.

2.1.3.2 Disposal Practices at Installation. The PA also identified past and present disposal methods of the wastes generated at the Base. Records to describe past waste disposal methods in the 1950s to 1980s were not available. Since the 1980s, waste disposal methods on the Base have included neutralization and disposal through the sanitary sewer, off-site disposal by a contractor, incineration during fire training activities, disposal by the Defense Reutilization and Marketing Office, disposal on the ground, returning to base supply for recovery/recycle by an independent contractor, and disposal into drains leading to the sanitary sewer.

2.1.3.3 Past Environmental Incidents and Problems. Based on interviews with past and present employees, analysis of pertinent information and Base records, and a field survey, the PA identified seven potentially contaminated disposal and/or spill sites at the Base. A more detailed description of spill/disposal incidents at the sites pertinent to this RI is provided in Section 2.3.

2.1.3.4 Regulatory Record Review. Review of existing investigation reports indicates that a regulatory record review of the Base has not been conducted. ERM contracted Environmental Risk Information & Imaging Services to provide a report on the status and locations of sites within a 1-mile radius of the NVANG Base that are included in selected environmental databases. The search indicated the presence of four facilities listed on the Resource Conservation and Recovery Information System's (RCRIS) large quantity generator list within a 1-mile radius of the NVANG Base. Eleven facilities were listed on the RCRIS small quantity generator list. Sixty-three properties, including the NVANG Base, were listed on the state registered underground storage tank (UST) file list. Twenty-three USTs were registered to the NVANG.

Three leaking UST incidents were reported within a 1-mile radius of the NVANG Base. Two of these leaking UST incidents are located northwest and upgradient of the NVANG Base. One leaking UST is within a one-half mile radius of the Base. Neither of these leaking UST sites have reached case closure status.

2.2 Previous Investigations

The following sections and Table 2-1 summarize previous investigations conducted as part of the IRP at the NVANG Base. The sites are illustrated on Figure 2-1.

2.2.1 IRP

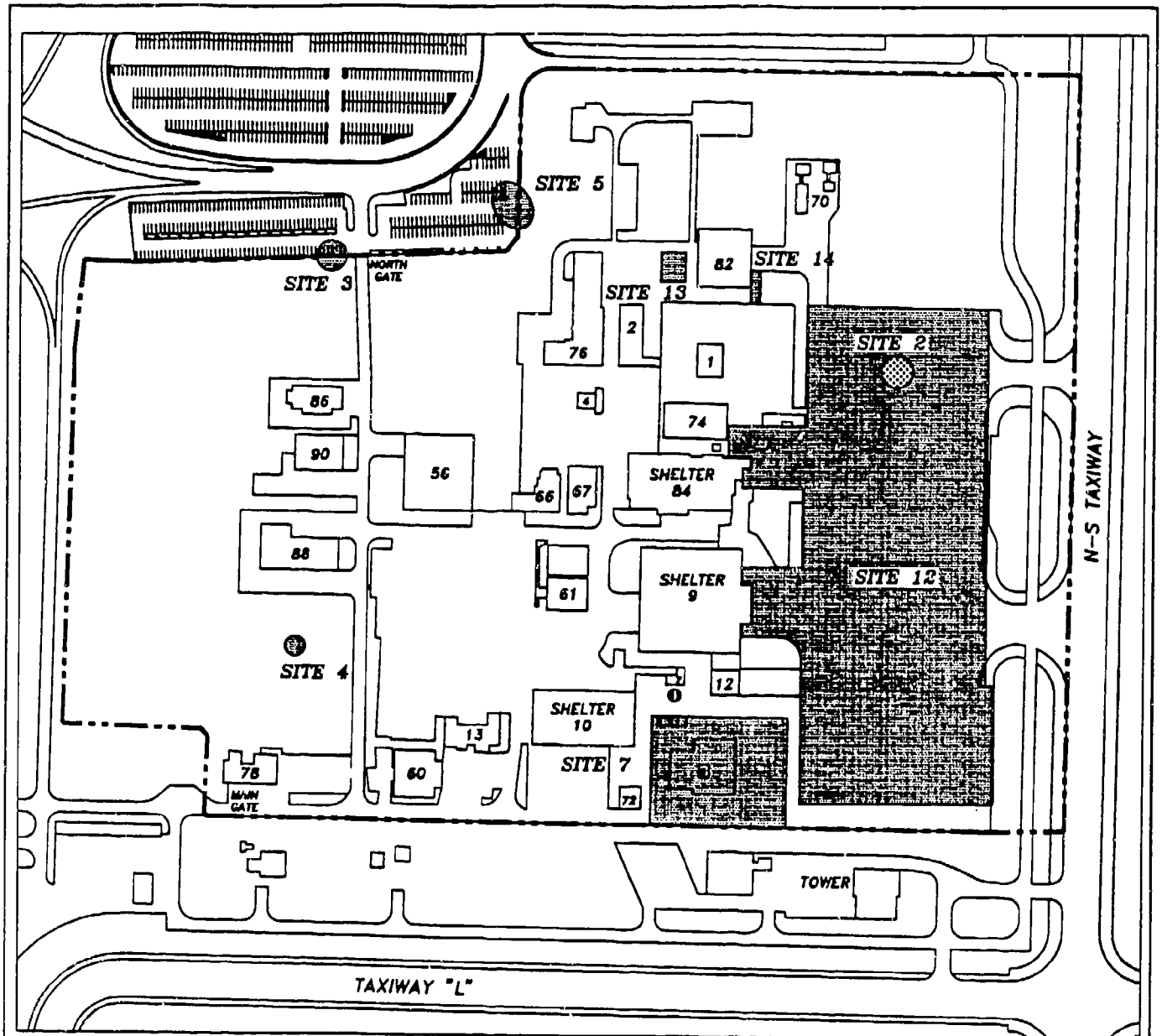
The following is a summary of the PA and SI conducted at the NVANG Base.

2.2.1.1 PA. A PA was conducted at the Base in June 1988 by ASG. It focused on past and present generation, use, handling, and disposal practices of hazardous waste and materials. Based on the results of the PA, seven sites were identified as potentially contaminated with

TABLE 2-1

Summary of Previous Investigations
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Date	Investigators	Sites	Work Performed
January 1989	Automated Sciences Group, Inc.	1 through 7	Preliminary Assessment
October 1991	PEER Consultants	12	Rapid Response Site Assessment
April 1994	Oak Ridge National Laboratory/Environmental Technology Section	2, 3, 4, 5, 7, 13, and 14	Site Investigation
June 1994	Operational Technologies Corporation	12	Site Investigation
April, July, and September 1994	Oak Ridge National Laboratory/Environmental Technology Section	Not applicable	Quarterly Monitoring of eight Monitoring Wells
January 1995	Environmental Resources Management-West, Inc.	Not applicable	Quarterly Monitoring of eight Monitoring Wells



SOURCE: ORNL/ETS, 1994

FIGURE 2-1

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LOCATION OF IRP SITES
2, 3, 4, 5, 7, 12, 13, AND 14
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

hazardous materials/waste and were recommended for further IRP investigations. The sites were as follows:

- Site 2 - Former FTA;
- Site 3 - Former FTA;
- Site 4 - Former FTA;
- Site 5 - Former FTA;
- Site 7 - POL Storage Area;
- Site 13 - Storm Drain at Aerospace Ground Equipment (AGE) Storage Lot; and
- Site 14 - OWS at Building 82.

2.2.1.2 SI. An SI was conducted at the NVANG Base by ORNL/ETS under agreement with the Hazardous Waste Remedial Action Program (HAZWRAP) operated by Energy Systems, Inc. in Oak Ridge, Tennessee. The results of the SI were reported in April 1994. The SI focused on five of the sites identified in the PA and two additional sites identified by Base personnel (Figure 2-1).

The IRP sites below were part of the SI, and a NFA DD was recommended.

- Site 2 - FTA: No ground water contamination was present at the site, soil contamination was below the Nevada Division of Environmental Protection (NDEP) soil remediation criteria, and the site was part of the investigation of Site - 12 Aircraft Parking Apron Area. Therefore, a NFA DD was recommended. The installation of an additional monitoring well downgradient of the site was recommended to confirm the origin of downgradient ground water contamination and to support a NFA DD for ground water.
- Site 3 - Former FTA: Due to the absence of soil and ground water contamination, a NFA DD was recommended.
- Site 13 - Storm Drain at the AGE Storage Lot: Due to the absence of soil and ground water contamination above any remediation standards, a NFA DD was recommended.

An RI/FS was recommended for IRP Sites 4, 5, 7, and 14. These sites are discussed in Section 2.3.

2.2.2 Other Investigations

Although Site 12 - Aircraft Parking Apron Area was not identified in the IRP PA for the Base, it has been investigated by OpTech. An SI was initiated due to fuel odors detected during a routine replacement of one of the concrete slabs at the aircraft parking apron on the site. The investigation began in October 1993 and was completed in January 1994.

Site 12 - Aircraft Parking Apron Area is located at the southeast corner of the NVANG Base (Figure 2-1). The site is an open parking apron approximately 360 by 1,020 feet. There are five areas, approximately 100 by 325 feet, where aircraft are parked, serviced, and refueled. Two JP-4 spills were reported, one occurring in the 1970s and one in 1986. According to the Environmental Pollution Incident Report, a spill of an estimated 40 gallons of JP-4 occurred at the south end of the parking apron on August 1, 1986. Records of the spills were not required in the 1970s and no data is available for this time period. Numerous spills were reported around the POL storage facility (Building 6) to the west of the site, mostly between 1973 and 1985. Fuel spills of up to 1,000 gallons have occurred in this area. Prior to the early 1980s, most of these spills were flushed into the soil/gravel areas surrounding the refueling stand (ASG, 1989).

Site 12 - Aircraft Parking Apron Area is important because of its proximity to IRP Site 7 - POL Storage Area and because it incorporates IRP Site 2 - Former FTA. IRP Site 2 - Former FTA is located in the northern portion of the Aircraft Parking Apron Area, and IRP Site 7 - POL Storage Area is located adjacent to the southwest corner of the Aircraft Parking Apron Area.

Prior to the OpTech investigation, two investigations had been conducted at these three sites. PEER conducted a Rapid Response Site Assessment in October 1991 to investigate hydrocarbon contamination discovered during replacement of a portion of the aircraft parking apron of Site 12. ORNL/ETS subsequently investigated Site 2 - Former FTA and Site 7 - POL Storage Area during the investigation of seven IRP sites from September 1992 through March 1993.

Benzene, toluene, ethylene, and xylene (BTEX) were detected in 70 of 150 soil vapor samples analyzed by OpTech. BTEX and total petroleum hydrocarbons (TPH) were detected in soil samples at concentrations less than Nevada Department of Conservation and Natural Resources (NDCNR) cleanup levels. TPH and benzene concentrations detected in soil samples collected during the PEER and ORNL/ETS investigations exceeded NDCNR cleanup levels. Lead was detected by OpTech in all soil samples at concentrations below the mean background concentration reported by ORNL/ETS. Lead at concentrations

exceeding the federal drinking water standard were detected in ground water samples collected by OpTech from five monitoring wells on the site. Significant microbiological activity was also detected underneath the site. Hydrocarbon degrading bacteria were not present in the analyzed samples.

2.2.3 Ground Water Monitoring

A quarterly ground water monitoring program was instituted at the NVANG Base in 1994. Prior to the start of RI field work in May 1995, a group of eight monitoring wells (MW06, MW07, MW08, MW23, MW24, MW25, MW26, and MW27) were sampled in April, July, and September 1994 and January 1995. Data collected during these quarterly rounds have been summarized in quarterly monitoring reports prepared by ORNL/ETS and ERM. ERM (1995a) summarizes the results of quarterly monitoring performed up through the January 1995 round. Ground water samples were collected for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and TPH. Ground water elevations were also measured in the eight monitoring wells.

2.3 IRP Site Descriptions

The following sections describe IRP sites 4, 5, 7, and 14, which were investigated during the RI.

2.3.1 IRP Site 4 - Former FTA

The following is a description of IRP Site 4 - Former FTA, including past uses, release history of the site, and results and recommendations of the SI conducted by ORNL/ETS.

2.3.1.1 Description. Site 4 - Former FTA is located on land leased by the Base south of Building 88 and is currently used as a baseball field. The Base was the sole operator and used this area in conjunction with Site 5 (Former FTA 5) from 1970 to 1973. FTA 4 is a flat, open earthen area, slightly bermed to contain the flammable liquids used during training exercises.

2.3.1.2 Release History. Spent solvents, waste oils, "slop wastes," JP-4 fuel, and other flammable liquids were burned during training exercises in this area. A water base was applied to the FTA prior to each burn.

Training exercises were conducted on an "as needed" basis, estimated at once or twice a year. An estimated 150 gallons of flammable liquids per burn were used. On the basis of two burns per year, it is estimated that 300 gallons per year of flammable liquids were used. Assuming 70 percent of the flammable liquids used were destroyed during training exercises, an estimated 90 gallons of flammable liquids remained per year to evaporate or infiltrate the ground. Based on this assumption, an estimated maximum of 270 gallons of flammable liquids may have infiltrated the ground during the 3-year period that this FTA was in use (ASG, 1989).

2.3.1.3 SI Findings and Recommendations. Five soil borings and three monitoring wells were drilled at Site 4 - Former FTA (Figure 2-2). Tables 2-2 and 2-3 present the results of soil and ground water sample analyses. Analytical results of Site 4 - Former FTA soil samples indicated the presence of elevated concentrations of fuel-related VOCs (benzene, ethylbenzene, and xylenes). Additionally, elevated concentrations of TPH were detected in the soil samples.

VOCs were detected in ground water samples collected from monitoring wells located at Site 4 - Former FTA. Compounds detected include acetone, methylene chloride, BTEX. and trichloroethylene (TCE). Of these, only benzene and TCE were detected at concentrations exceeding the current maximum contaminant levels (MCLs).

Several SVOCs were also present in the ground water samples. ORNL/ETS did not consider detection of bis(2-ethylhexyl)phthalate to be significant due to the relatively low concentrations reported, the compound's ubiquity in the environment, and its use at the analytical laboratory. The remainder of the SVOCs reported consists of polynuclear aromatic hydrocarbons (PAHs) that were inconsistently detected at very low concentrations that did not exceed applicable MCLs.

Due to the presence of soil contamination above NDEP remediation criteria for TPH and VOCs, and ground water contamination above NDEP remediation criteria (MCLs) for benzene and TCE, the SI recommended an RI/FS for IRP Site 4 - Former FTA.

2.3.2 IRP Site 5 - Former FTA

The following is a description of IRP Site 5 - Former FTA, including past uses and release history of the site.

2.3.2.1 Description. Site 5 - Former FTA is located between the northwest corner of Building 76 and the southeast corner of the

TABLE 2-2

Organic Compounds Detected in Site 4 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	BH12-2	BH12-6	BH12-8	BH13-2	BH13-4	BH13-8	BH14-4	BH14-6	BH14-8	BH15-2	BH15-6	BH15-6D
VOCs, µg/kg												
Ethylbenzene			1,300 J						400 J	72		
Methylene chloride			1,900 J									
Xylenes			4,600						1,000 J	170	2 J	
Chloroform							1 J	2 J				
Acetone									1,800 J			
Benzene										5 J		
SVOCs, µg/kg												
bis(2-Ethylhexyl) phthalate	170 J	180 J	590 J	230 J	190 J	120 J	330 J	73 J	500	97 J	83 J	590
2-Methylnaphthalene			910						1,200			
Naphthalene			1,500						2,100			
Pyrene										45 J		
Phenol												52 J
TPH, mg/kg												
Total Petroleum Hydrocarbons	0.01 J		630			120	0.10 J		3,800	9.20	0.39 J	250

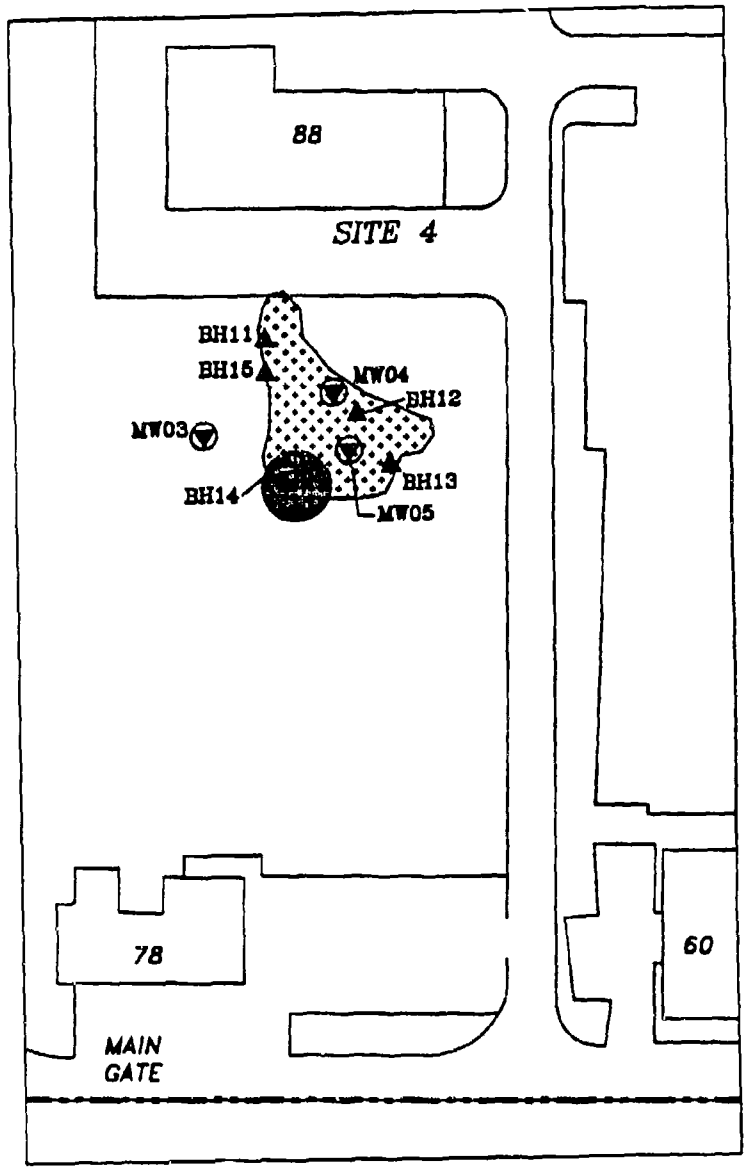
Soil samples collected in December, 1992
Blank space indicates compound was not detected or was flagged unusable during data validation.
D = indicates duplicate sample
J = Reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
Source: ORNL/ETS SI Report (1994)

TABLE 2-3

Organic Compounds Detected in Site 4 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	MW03 12/1/92	MW03 3/3/92	MW04 12/1/92	MW04 3/3/92	MW05 12/1/92	MW05 12/1/92 D	MW05 3/3/92	MW05 3/3/92 D
VOCs, µg/l								
Benzene					18.0	17.0	24.0	23.0
Ethylbenzene					17.0	12.0	27.0	24.0
Toluene					24.0	21.0	37.0	33.0
Trichloroethylene					20.0	14.0	8.0	9.0
Xylenes					210.0	200.0	450.0	450.0
Acetone				2.0 J				
Methylene chloride				3.0				
SVOCs, µg/l								
1,2-Dichlorobenzene					1.0	2.0	5.0	11.0
1,3-Dichlorobenzene							2.0	3.0
1,4-Dichlorobenzene							2.0	4.0
2-Methylnaphthalene							2.0	4.0
2,4-Dimethylphenol					2.0	1.0		
bis(2-Ethylhexyl) phthalate						58.0 J		
Butylbenzyl phthalate								2.0
Di-*n*-butyl phthalate								2.0
Naphthalene					8.0	6.0	9.0	17.0
TPH, mg/l								
Total Petroleum Hydrocarbons					1.2	0.74	2.4	0.74

Blank space indicates compound was not detected
D = indicates duplicate sample
J = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.
µg/l = micrograms per liter
mg/l = milligrams per liter
Source: ORNL/ETS SI Report (1994)



SOURCE: ORNL/ETS, 1994

FIGURE 2-2

IRP SITE 4 – FORMER FTA,
SOIL BORING AND
MONITORING WELL LOCATIONS
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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Airport Authority of Washoe County (AAWC) parking lot on land leased by the Base. The Base was the sole operator and used this FTA in conjunction with Site 4 - Former FTA, as described above, from 1970 to 1977. This FTA consisted of a flat, unlined, open earthy area, slightly depressed, and bermed around the edges to contain the flammable liquids used during training exercises. A mock-up model of an aircraft was used during training at this site.

2.3.2.2 Release History. Spent solvents, waste oils, "slop wastes," JP-4 fuel, and other flammable liquids were used during joint training exercises with the AAWC and the Base supplying the flammable liquids for the burns. A water base was applied to the FTA prior to ignition of each burn.

An estimated ten fire-training exercises per year were conducted at this FTA. An estimated 150 gallons of flammable liquids per burn were used. Based on ten burns per year, it is estimated that 1,500 gallons per year of flammable liquids were used. Assuming that 70 percent of the flammable liquids released at FTA 5 were destroyed, an estimated 450 gallons per year of flammable liquids remained to evaporate or infiltrate the ground. Based on this assumption, an estimated maximum of 3,200 gallons of flammable liquids may have infiltrated the ground during the 7-year period that this FTA was in use (ASG, 1989).

2.3.2.3 SI Findings and Recommendations. Five soil borings and three monitoring wells were drilled at Site 5 - Former FTA (Figure 2-3). Tables 2-4 and 2-5 present the results of soil and ground water sample analyses. Fuel-related VOCs (ethylbenzene and xylenes) were detected in several soil samples collected from soil borings drilled at Site 5 - Former FTA. Additionally, elevated concentrations of TPH were detected in some samples.

VOCs were detected in ground water samples collected from monitoring wells located at Site 5 - Former FTA. Compounds detected included BTEX and 1,2-dichloroethylene (1,2-DCE). Of these, only benzene was reported at concentrations exceeding the current MCLs.

Two SVOCs were also detected in the ground water samples. The SI did not consider detection of bis(2-ethylhexyl)phthalate significant due to the relatively low concentrations reported, the compound's ubiquity in the environment, and its use at the analytical laboratory. The presence of naphthalene was considered insignificant due to its low estimated concentration.

TABLE 2-4

Organic Compounds Detected in Site 5 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	BH06-2	BH06-4	BH06-6	BH07-2	BH08-6	BH08-7	BH09-2	BH09-6	BH09-7	BH10-2	BH10-8	BH10-9
VOCs, µg/kg												
Chloroform				1 J					2 J			
Acetone			1,900 J		14 J	12 J						
Methylene chloride			4,200 J									
Ethylbenzene			1,800 J									
Xylenes			9,700									
SVOCs, µg/kg												
2-Methylnaphthalene			3,300									
Fluorene			110 J									
Naphthalene			2,400									
bis(2-Ethylhexl) phthalate	62 J	180 J	500 J	250 J	230 J	220 J	190 J	210 J	200 J		260 J	250 J
Benzo[*a*]anthracene	52 J	41 J										
Benzo[*a*]pyrene	52 J											
Benzo[*b*]fluoranthene	96 J	63 J										
Benzo[*g,h,i*]perylene	88 J											
Benzo[*k*]fluoranthene	96 J											
Chrysene	48 J											
Dibenz[*a,h*]anthracene		41 J										
Fluoranthene	94 J		96 J									
Indeno[1,2,3-*cd*]pyrene	39 J											
Phenanthrene	58 J											
Pyrene	73 J	70 J	68 J									
TPH, mg/kg												
Total Petroleum Hydrocarbons			2,166.45					19	0.08 J	9.9		0.02 J

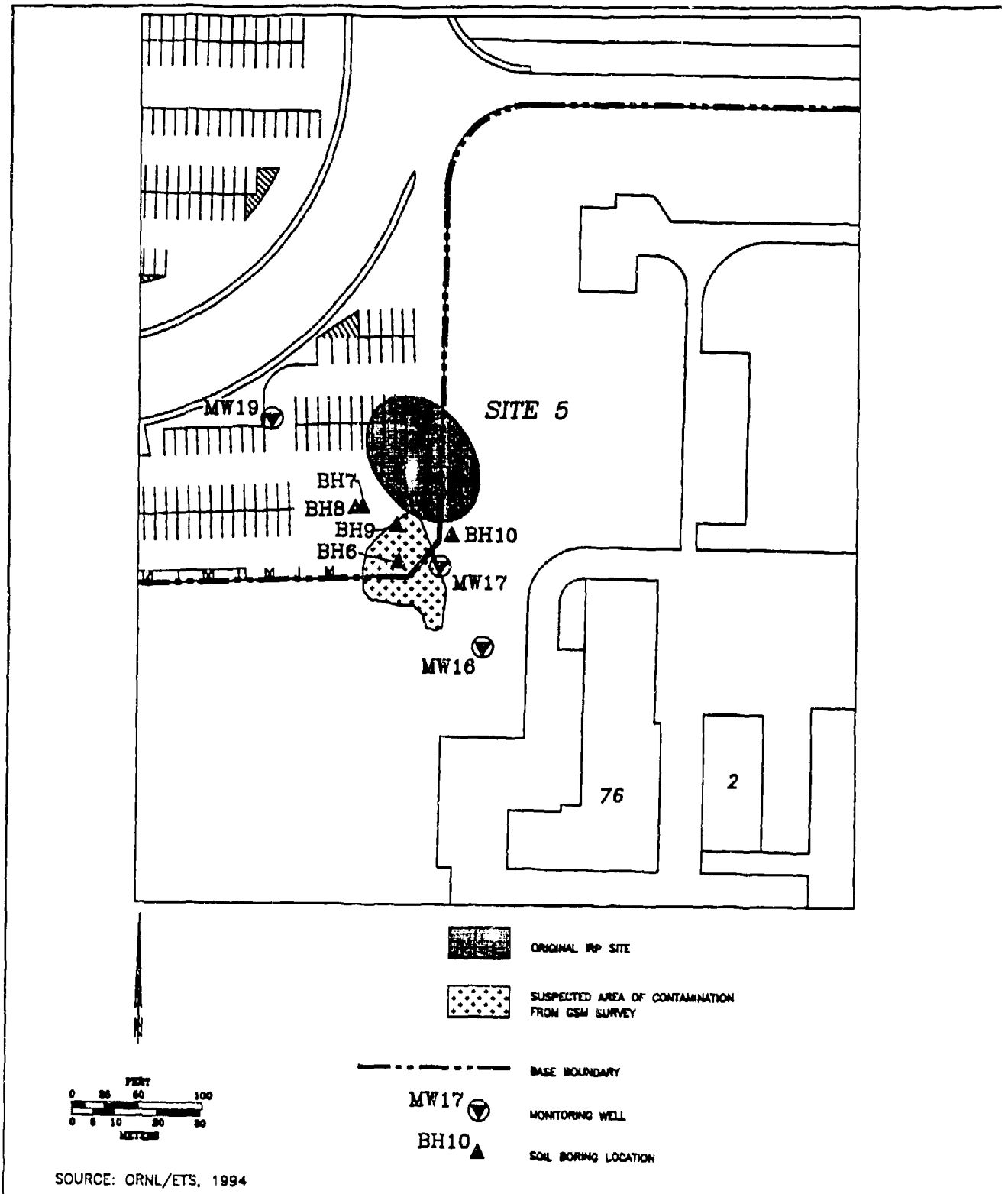
Soil samples collected in December, 1992
Blank space indicates compound was not detected or was flagged unusable during data validation.
J = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
Source: ORNL/ETS SI Report (1994)

TABLE 2-5

Organic Compounds Detected in Site 5 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	MW16 12/4/92	MW16 12/4/92 D	MW16 3/5/92	MW16 3/5/92 D	MW17 12/3/92	MW17 3/5/92	MW19 12/1/92	MW19 3/5/92
VOCs, µg/ml								
Acetone								
Benzene	1.0 J	1.0 J			2.0 J	15.0		
Ethylbenzene					4.0 J	24.0		
Xylenes					12.0	7.0 J		
Toluene					7.0 J	1.0 J		
1,2-Dichloroethylene					2.0 J	4.0 J		
SVOCs, µg/l								
bis(2-Ethylhexyl) phthalate	1.0 J	1.0 J				20.0 J		
Naphthalene						1.0 J		
TPH, mg/l								
Total Petroleum Hydrocarbons					0.1	0.15		

Blank space indicates compound was not detected
D = indicates duplicate sample
J = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.
µg/l = micrograms per liter
mg/l = milligrams per liter
Source: ORNL/ETS SI Report (1994)



SOURCE: ORNL/ETS, 1994

FIGURE 2-3

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IRP SITE 5 – FORMER FTA, SOIL BORING AND MONITORING WELL LOCATIONS

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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Due to the presence of soil contamination above NDEP remediation criteria for TPH and VOCs, and ground water contamination above NDEP remediation criteria (MCLs) for benzene, the SI recommended an RI/FS for IRP Site 5 - Former FTA.

2.3.3 IRP Site 7 - POL Storage Area

The following is a description of IRP Site 7 - POL Storage Area, including past uses and release history of the site.

2.3.3.1 Description. Site 7 - POL Storage Area surrounds Building 6 and consists of four 25,000-gallon USTs holding JP-4 fuel for flight line operations and ancillary equipment. These JP-4 fuel USTs have been in the ground for over 30 years (ASG, 1989, Appendix F). Visual inspections have been made periodically, the last one in April 1986, to ascertain the condition of these USTs. The inspections revealed medium rusting with light pitting on the interior surfaces of the USTs.

2.3.3.2 Release History. Numerous small JP-4 fuel spills have occurred around the refueling stand area of Building 42. Most of the spills occurred between 1973 and 1985, when the fuel trucks were top-loading vehicles. On several occasions, JP-4 fuel spills of up to 1,000 gallons occurred in this area. A fuel spill of up to 300 gallons occurred in June 1986 when a bottom-loading shutoff valve on a refueling unit failed to operate properly. Other smaller spills of up to 100 gallons have occurred during defueling of fuel trucks. Prior to the early 1980s, most of these spills were flushed into the soil/graveled areas surrounding the refueling stand (ASG, 1989).

2.3.3.3 SI Findings and Recommendations. Five soil borings and six monitoring wells were drilled at Site 7 - POL Storage Area (Figure 2-4). Tables 2-6 and 2-7 present the results of soil and ground water analyses. Analytical results from Site 7 - POL Storage Area indicate the presence of elevated concentrations of fuel-related VOCs (BTEX) in the soil. Additionally, elevated concentrations of TPH were detected in the soil samples. The occurrence of numerous PAHs suggested that these compounds are derived from the identified fuel contamination.

Analytical results of ground water samples indicate significant VOC contamination at Site 7 - POL Storage Area, most of which is related to floating product at the site. The SI concluded that the source of the floating product appeared to be limited to the immediate area and not related to the upgradient JP-4 fuel tanks. Product thickness in monitoring well MW07 averaged less than 2 inches, which, when converted to actual thickness on the water table by dividing by four,

TABLE 2-6

Organic Compounds Detected in Site 7 - POL Storage Area Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	BH27-2	BH27-5	BH27-5D	BH28-2	BH28-5	BH28-8	BH29-2	BH29-5	BH29-5D	BH29-7	BH30-2	BH30-5	BH30-8	BH31-2	BH31-5	BH31-5D	BH31-8
VOCs, µg/kg																	
2-Butanone				8 J		1,100 J						1,300 J			1,200 J		
Acetone					78 J			38 J			120 J						
Benzene		3 J	2 J	19	14 J						4 J					670 J	230 J
Chloroform		4 J	2 J	3 J	4 J				2 J								
Ethylbenzene		50	120	94	320	1,100 J					8 J	2,300			630 J	24,000	
Xylenes	44,000	280	420	200	1,500	5,600					56	8,200	5 J		2,600	82,000	1,400 J
Toluene		7.0 J		39	140	520 J										3,900	
Dibenzofuran				485													
SVOCs, µg/kg																	
2-Methylnaphthalene	13,000	480	600	180 J	950	2,000 J					1,600	240 J			1,300	20,000 J	1,300
4-Methylphenol					20 J												
Benzo[*a*]anthracene	5,200 J	85 J	73 J	580	110 J		40 J	44 J				66 J					
Benzo[*a*]pyrene	4,600 J	58 J	47 J	580													
Benzo[*b*]fluoranthene	9,000	110 J	110 J	850	110 J		57 J					120 J					
Benzo[*g,h,i*]perylene	2,600 J			310 J													
Benzo[*k*]fluoranthene	9,000 J	110 J	110 J	850 J	110 J		57 J					120 J					
bis(2-Ethylhexyl) phthalate		570	520	380 J	110 J		100 J	150 J	120 J	110 J	91 J	88 J	100 J	110 J			
Carbazole	1,700 J			82 J	52 J												
Chrysene	6,300 J	70 J	73 J	660	130 J		52 J					67 J					
Dibenzofuran				48 J													
Fluoranthene	13,000	130 J	150 J	800	210 J	300 J	110 J	96 J		49 J		130 J					
Fluorene	1,000 J			99 J													
Indeno[*1,2,3-cd*]pyrene	2,700 J			300 J													
Naphthalene	11,000	320 J	500	200 J	670	1,700 J					1,300	190 J			1,100	13,000 J	930
Phenanthrene	11,000	160 J	230 J	580	260 J	410 J	130 J	120 J	47 J	54 J		90 J					
Phenol		45 J	86 J	77 J	220 J	350 J									98 J		150 J
Pyrene	16,000	250 J	250 J	1,500	280 J	430 J	110 J	99 J				120 J					
Acenaphthene	1,300 J			100 J	62 J						54 J					350 J	
Anthracene	2,000 J			30 J	72 J												
2,4-Dimethylphenol															180 J	190 J	210 J
TPH, mg/kg																	
Total Petroleum Hydrocarbons	2,500	87	33	9.6 J	590	1,600	2			0.06 J	5.8	570	3.1 J				2,800

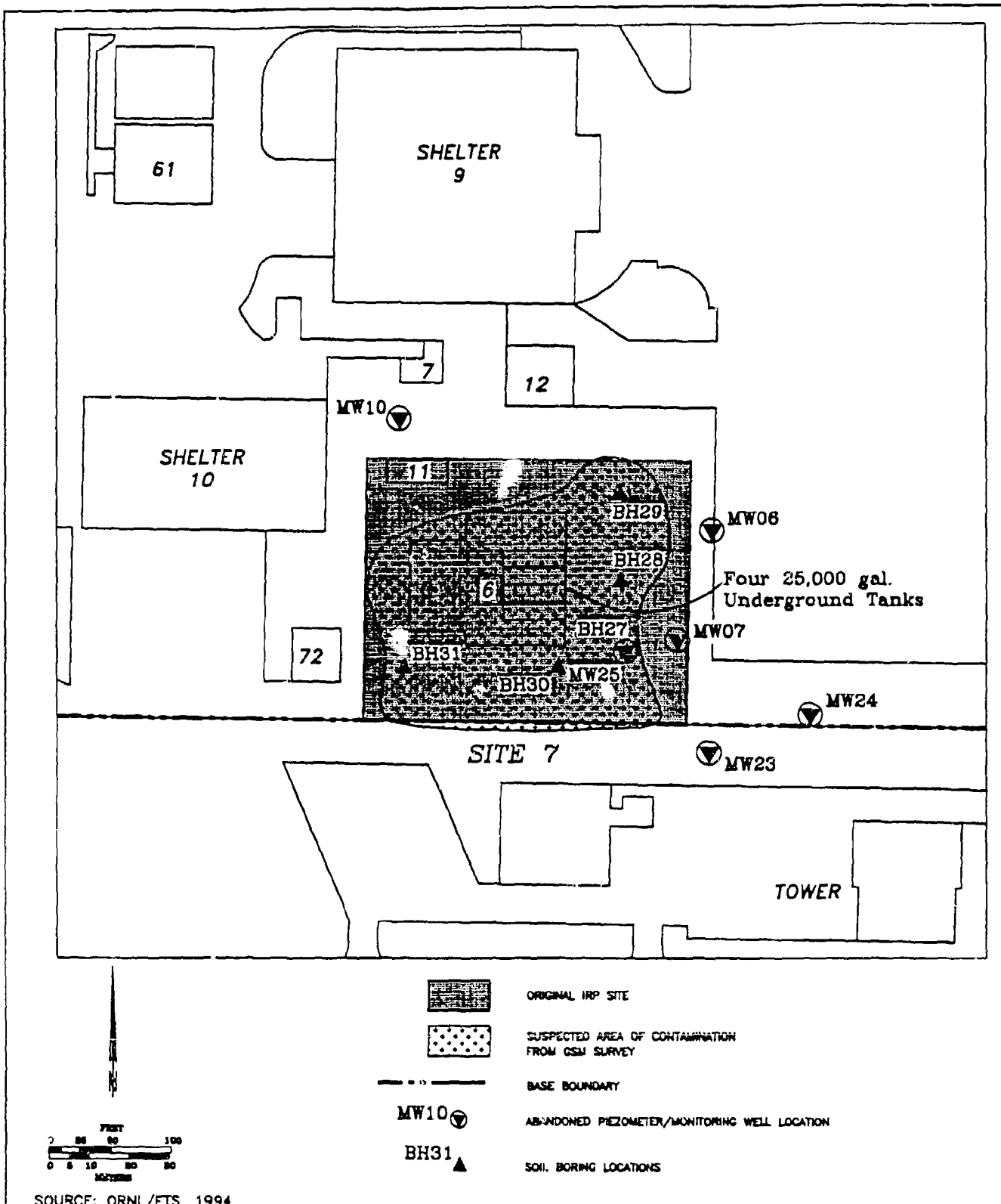
Soil samples collected in December, 1992
Blank space indicates compound was not detected.
D = indicates duplicate sample
J = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.
µg/kg = micrograms per kilogram

TABLE 2-7

Organic Compounds Detected in Site 7 - POL Storage Area Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	MW06 12/6/92	MW06 3/6/92	MW07 12/6/92	MW07 3/6/92	MW10 12/6/92	MW10 3/6/92	MW23 12/6/92	MW23 3/6/92	MW24 12/6/92	MW24 3/6/92	MW25 12/6/92	MW25 3/6/92
VOCs, µg/l												
Acetone												
Benzene	21	67	2,300	2,100							620	380
Carbazole											4.0 J	3.0 J
Chloroform		1.0 J								1.0 J		
Ethylbenzene		55	480	480								14 J
Methylene chloride			76 J	51 J								
Xylenes	63	73	1,400	1,000							92	59
Toluene	6.0 J	1.0 J					2.0 J		2.0 J		7.0 J	8.0 J
Trichloroethylene	1.0 J											
1,2-Dichloroethane	2.0 J											
1,2-Dichloroethylene					5.0 J	2.0 J						
Phenol	2.0 J											
SVOCs, µg/l												
Acenophthene				330 J							1.0 J	2.0 J
Anthracene				260 J							1.0 J	
2-Methylnaphthalene		3.0 J	960	9,600							5.0 J	8.0 J
Fluoranthene			76 J	700 J							1.0 J	
Fluorene				300 J								1.0 J
2,4-Dimethylphenol		1.0 J									5.0 J	3.0 J
bis(2-ethylhexyl) phthalate	17 J			190 J			1.0 J		3.0 J		19.0 J	
Benzo[*a*]anthracene				330 J								
Benzo[*a*]pyrene				190 J								
Benzo[*b*]fluoranthene				320 J								
Benzo[*k*]fluoranthene				320 J								
Chrysene				380 J								
Diethylphthalate							1.0 J		1.0 J			
Dibenzofuran				180 J								
Phenol		4.0 J									2.0 J	1.0 J
Di-*n*-butylphthalate	2.0 J										22	32
Naphthalene		6.0 J	840	6,900							1.0 J	
Phenanthrene			83 J	760 J							6.0 J	12.0
Pentachlorophenol											3.0 J	2.0 J
Pyrene			96 J	780 J								
TPH, mg/l												
Total Petroleum Hydrocarbons	0.56	1.6	28	14.0		0.05 J					2.6	1.8

Blank space indicates compound was not detected
J = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.
µg/l = micrograms per liter
mg/l = milligrams per liter
Source: ORNL/ETS SI Report (1994)



SOURCE: ORNL/ETS, 1994

FIGURE 2-4

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IRP SITE 7 – POL STORAGE AREA, SOIL BORING AND MONITORING WELL LOCATIONS

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NVANG, RENO, NEVADA

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equals the NDEP removal-action guideline of 0.5 inches actual thickness. To mitigate the floating-product situation in monitoring well MW07, periodic product-thickness measurement and bailing were being performed by NVANG Base personnel. Compounds detected include BTEX, 1,2-DCE, 1,2-dichloroethane, chloroform, and methylene chloride. Of these, only benzene was detected in ground water at concentrations exceeding the current MCLs.

The presence of PAHs in the ground water suggests that the source of these compounds is fuel-related. With the exception of benzo[a]pyrene, none of the PAHs reported in Site 7 - POL Storage Area ground water have current or proposed MCLs. Benzo[a]pyrene, which was detected at 190 micrograms per liter (µg/l) in ground water samples collected from monitoring well MW07, exceeds the proposed MCL of 0.2 µg/l.

Due to the presence of soil contamination above NDEP remediation criteria for TPH, VOCs, and SVOCs, and ground water contamination above NDEP remediation criteria (MCLs) for benzene, the SI recommended an RI/FS for IRP Site 7 - POL Storage Area.

Following the SI, three ground water sampling events were conducted by ORNL/ETS (April and July 1994) and by ERM (January 1995) at nine monitoring wells at the NVANG Base, including five monitoring wells located at IRP Site 7 - POL Storage Area. During the ground water sampling rounds conducted by ORNL/ETS, decaying floating-phase fuel product was encountered in monitoring wells MW07 and MW25 at IRP Site 7 - POL Storage Area. To mitigate the floating product situation, periodic product thickness measurement and bailing were performed by NVANG Base personnel. The program of product removal from monitoring well MW07 was successful in reducing the thickness of floating product in the well. Product thickness was approximately 3 inches when the bailing program first began in March 1993. By January 1995, product thickness was reduced to a nonmeasurable amount (i.e., sheen). Observations made during the RI field work in May 1995 indicated that only a sheen remained on the water surface.

During an annual UST testing event, free product was encountered near the USTs located at IRP Site 7 - POL Storage Area. NDEP requested that the NVANG Base install a product removal system in Spring 1995. A product removal well was installed in May 1995 in conjunction with RI field work. The product removal system was installed in June 1995 and is currently operating by removing product to a storage tank. The product is periodically removed from the storage tank by a contractor.

2.3.4 IRP Site 14 - OWS

The following is a description of IRP Site 14 - OWS, including past uses and release history of the site.

2.3.4.1 Description. Site 14 - OWS was not included in the PA. Base personnel discovered a JP-4 fuel spill area in May 1991 when the 1,000-gallon OWS adjacent to Building 82 exceeded its holding capacity, causing the trough system to back up and overflow. Site 14 - OWS consists of an unprotected soil area at the southeast corner of Building 82 that received the overflow.

2.3.4.2 Release History. Base personnel estimate that approximately 25 to 50 gallons have spilled onto the soil area once or twice a year since 1975. Consequently, as much as 1,600 gallons of JP-4 fuel may have reached the soil area.

2.3.4.3 SI Findings and Recommendations. Six soil borings and two monitoring wells were drilled at Site 14 - OWS (Figure 2-5). Tables 2-8 and 2-9 present the results of chemical analysis of soil and ground water samples. Results of chemical analysis of soil samples collected from borings drilled at Site 14 - OWS indicate the presence of elevated TPH concentrations in soil in the area around the OWS.

No significant concentrations of VOCs were detected in ground water samples collected from monitoring wells located at Site 14 - OWS. Carbon disulfide, a common laboratory solvent, was detected in one sample at a concentration of 2 µg/l, along with low levels of phthalate. The SI concluded that detection of these compounds was indicative of laboratory contamination rather than environmental contamination.

Due to the presence of soil contamination above NDEP soil remediation criteria for VOCs, SVOCs, and TPH, the SI recommended an RI/FS for IRP Site 14 - OWS.

TABLE 2-8

Organic Compounds Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Chemical	BH21-4	BH21-8	BH21-8D	BH22-4	BH22-6	BH22-8	BH23-4	BH23-6	BH23-8	BH24-4	BH24-8	BH25-6	BH26-8
VOCs, µg/kg													
Tetrachloroethylene		3 J				3 J							
2-Butanone							11 J						
Chloroform				2 J								1 J	2 J
Methylene chloride								2,200 J	5,100 J				
Xylenes		13							2,500 J				2 J
SVOCs, µg/kg													
2-Methylnaphthalene		28,000						2,200	27,000				
bis(2-Ethylhexyl) phthalate												210 J	100 J
Dibenzofuran		210 J											
Naphthalene		14,000						920 J	16,000				
Acenaphthene		210 J											
TPH, mg/kg													
Total Petroleum Hydrocarbons	0.11	2,600	110		4.1	1,700	0.075	330	4,809	91.36	0.07 J		

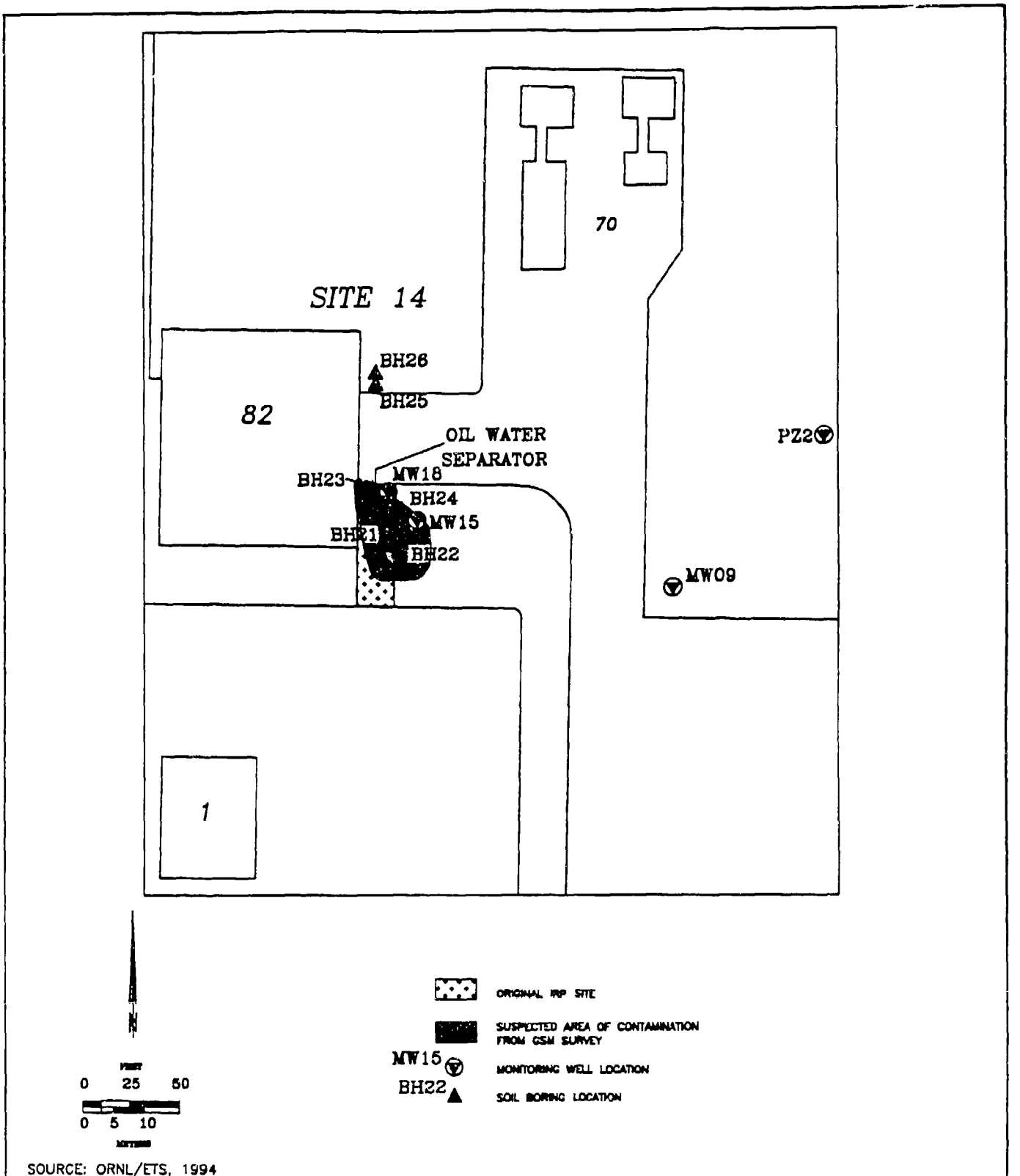
Soil samples collected in December, 1992
Blank space indicates compound was not detected.
D = indicate duplicate sample
J = reported value is below the contract required detection limit but above the instrument detection limit. Values are estimated quantities.
µg/kg = micrograms per kilograms
mg/kg = milligrams per kilograms
Source: ORNL/ETS SI Report (1994)

TABLE 2-9

Organic Compounds Detected in Site 14 - OWS Ground Water
152nd Tactical Reconnai: ·e Group, NVANG, Reno, Nevada

Chemical	MW18 12/3/92	MW18 3/4/92	MW15 12/3/92	MW15 3/4/92
VOCs, µg/l				
Carbon disulfide		2.0		
SVOCs, µg/l				
Butylbenzyl phthalate		1.0		1.0
Di-*n*-butyl phthalate		1.0		

Blank space indicates compound was not detected
µg/l = micrograms per liter
Source: ORNL/ETS SI Report (1994)



SOURCE: ORNL/ETS, 1994

FIGURE 2-5

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IRP SITE 14 - OWS,
SOIL BORING AND
MONITORING WELL LOCATIONS
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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SECTION 3.0

ENVIRONMENTAL SETTING

The environmental setting at the NVANG Base is presented here to establish a reference for describing sitewide work performed during the RI.

3.1 Topography

The average elevation of the Base is 4,400 feet above mean sea level. The area around Truckee Meadows is generally flat with a gentle slope to the west, although topographic relief is substantial in the surrounding mountain ranges (ASG, 1989).

3.2 Meteorology

The annual mean temperature for Reno, Nevada, is 49.9°F with a maximum monthly average of 91.3°F occurring in July and a minimum monthly average of 18.9°F occurring in December. The average daily temperature change is 35°F with a maximum daily temperature change of 43.5°F occurring in July and August (ASG, 1989).

National Oceanic and Atmospheric Administration Station No. 26-6779, located at Reno Cannon International Airport, records an average annual precipitation of 7.49 inches for the Reno, Nevada, area. According to the Water Atlas of the United States, Plate 12, the average annual evaporation from open water surfaces is 43 inches (ASG, 1989). Using the method outlined in the Federal Register (47 FR 31224, July 1982), the annual net precipitation for the Base is -35.51 inches (ASG, 1989). Rainfall intensity based on the 1-year, maximum 24-hour rainfall is calculated to be 1.5 inches (ASG, 1989).

3.3 Geology

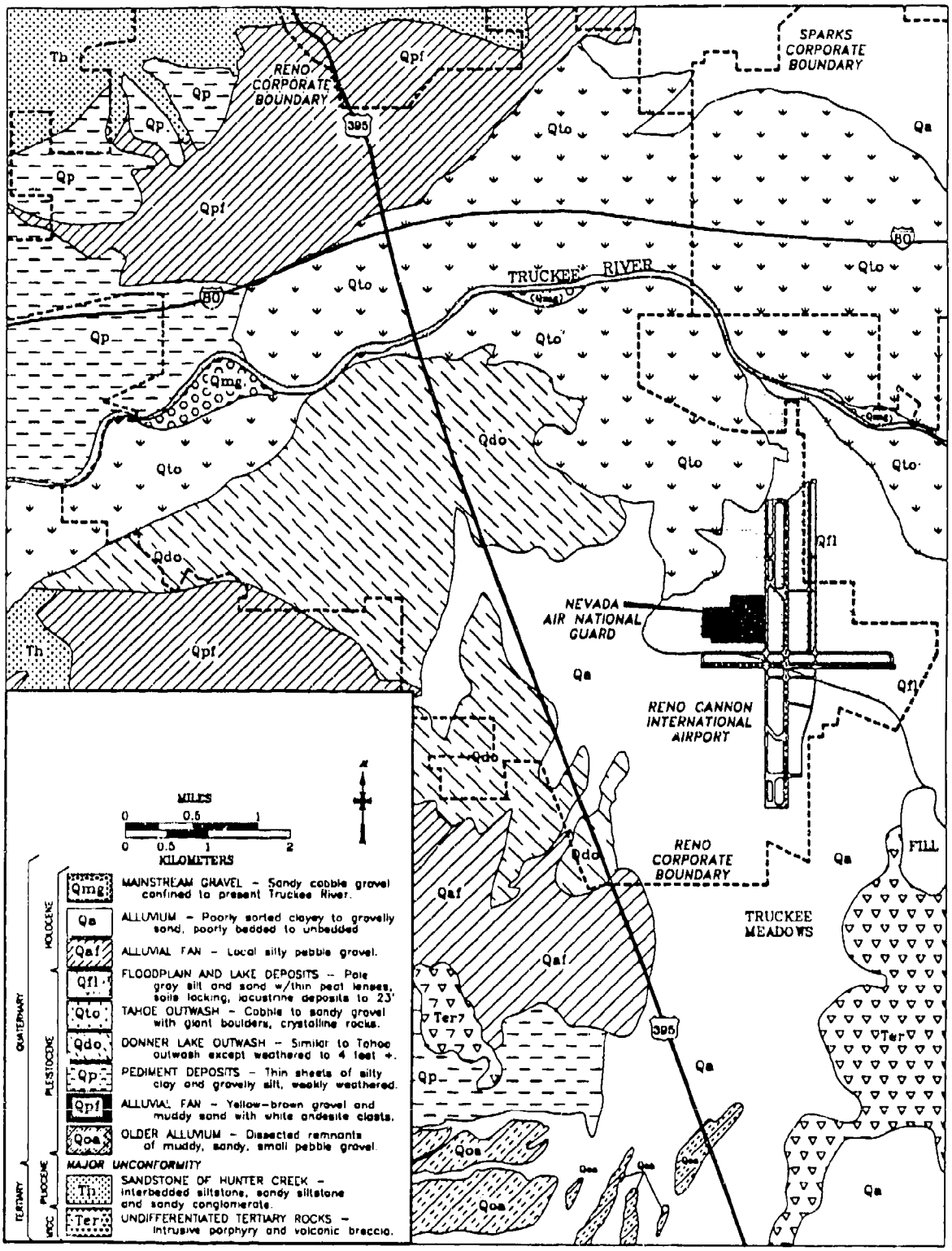
The majority of the information presented in the following sections was obtained from Cohen and Loeltz (1964), Bingler (1975), and the PA (ASG, 1989), which contains information derived from the Nevada

Bureau of Mines and Geology Report #25 (Bateman and Sheibach, 1975).

Geologic maps of the Reno and Mt. Rose quadrangles show that the northern portion of the Base lies on a Quaternary deposit termed "floodplain and lacustrine deposits" consisting of interbedded gray to pale grayish-yellow silt and fine-grained sand with thin lenses of peat. These are fluvial and lacustrine deposits up to 23 feet thick with little or no soil development (Bonham and Rogers, 1983). The southern portion of the air-field is underlain by deposits known as "alluvial Bajada deposits" consisting of thin, sheet-like aprons of fine- to medium-grained sand with intercalated muddy, medium-pebble gravel. These deposits result from low gradient streams that have reworked older gravelly outwash and alluvial fan deposits. They are weakly weathered and largely undissected, with little or no soil development (Bonham and Rogers, 1983).

The general geology of the Reno area, shown in Figure 3-1, consists of a north-trending basin known as the Truckee Meadows. This basin is located at the western margin of the Basin and Range physiographic province just east of the Sierra Nevada. Bingler (1975) describes the Truckee Meadows as a structural depression bounded on the west by the Carson Range, the Virginia Range on the east, Steamboat Hills to the south, and the eastern part of the Peavine Mountain block to the north. These marginal blocks consist of Mesozoic metavolcanic and plutonic rocks overlain by a thick sequence of Tertiary volcanic and epiclastic rocks. The Tertiary rocks are predominantly andesite and andesite porphyry flow rock, hypabyssal intrusives, and minor siliceous welded tuff, which are commonly represented by the Kate Peak and Alta Formations.

The foothill and mountain drainages that rim the basin contain large exposures of altered volcanic rock. Along the western margin of the basin and to the north and west along the Truckee River drainage basin, tilted beds of Miocene to upper Pliocene Hunter Creek Sandstone (composed of conglomerate, sandstone, and diatomite) are exposed, marking the start of early basin-sediment accumulation. The continuation of long-established patterns of basin-sediment accumulation is represented by the extensive Quaternary deposits exposed in the Truckee Meadows. A generalized stratigraphic column of the Truckee Meadows and surrounding area is presented in Figure 3-1.



SOURCE: ORNL/ETS, 1994

FIGURE 3–1

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GEOLOGIC MAP OF THE
RENO, NEVADA AREA

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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Bingler (1975) divided t[illegible] Quaternary deposits into three major categories:

- Main stream gravel deposits of the Truckee River represented by bouldery outwash from glacial activity;
- A long and complex history of alluvial fan deposition along the margins of the Truckee Meadows that extends in time from the Pleistocene into the Holocene; and
- Reworked older deposits and deposition of fine-grained clastic debris throughout the central part of the Truckee Meadows by low gradient streams during the Holocene and continuing to the present.

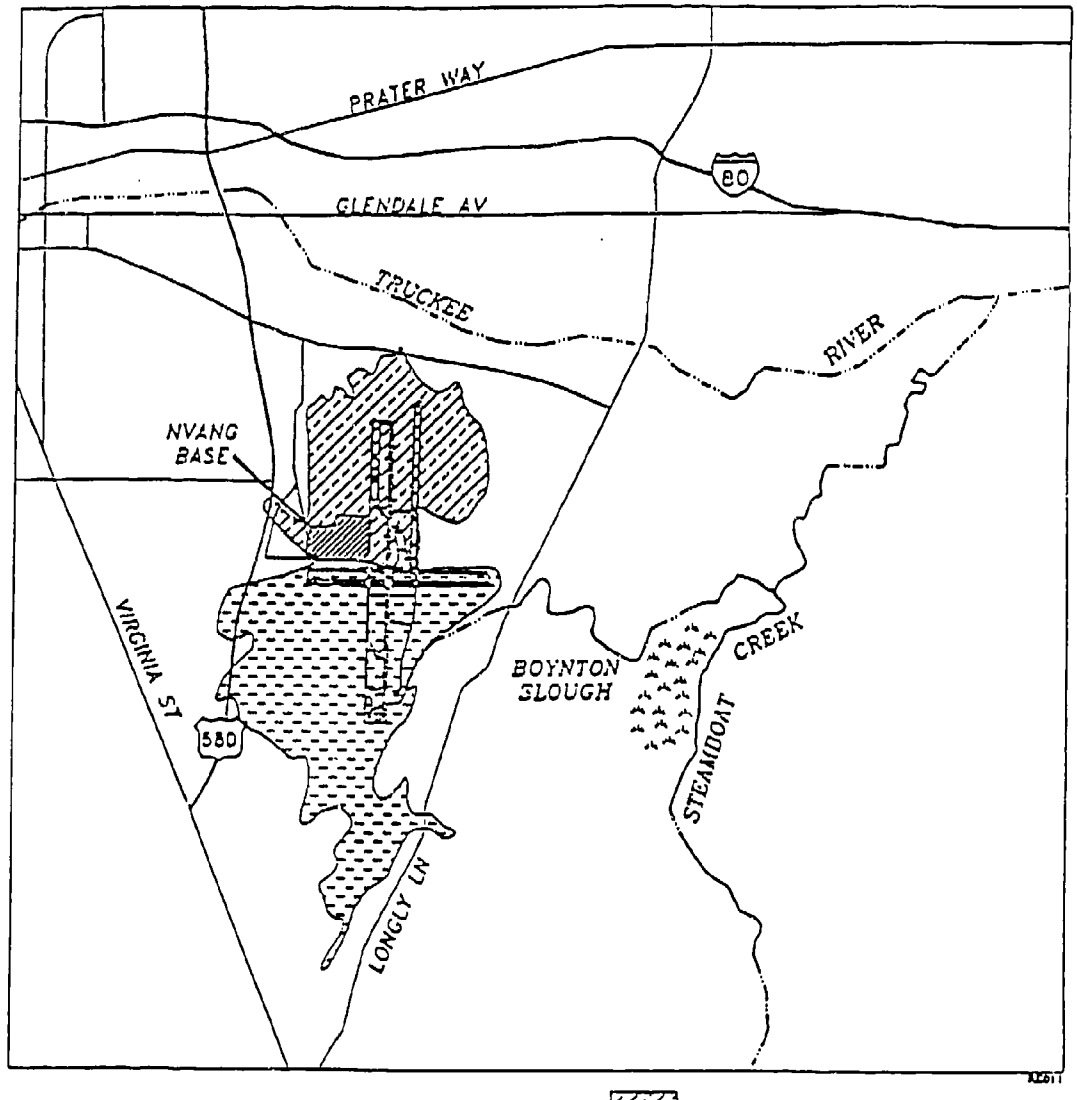
Geothermal activity in Truckee Meadows is found in two major areas known as Steamboat Springs and Moana. These activities are theorized to be due to the cooling of an intrusive body at a depth that may be connected to ground water resources throughout fault systems near these areas. Geothermal activity has a profound effect on ground water chemistry by means of hydrothermal alteration of volcanic rocks underlying Truckee Meadows.

3.4 Soils

The locations of the two general soil types found at the NVANG Base are shown in Figure 3-2. The soil descriptions below are based on the ASG PA (ASG, 1989) and were derived from the Soil Survey of Washoe County, Nevada, South Part (Baumer, 1983).

The Truckee sandy loam, gravelly substratum covers the northern half of the airport and all of the Base property (Baumer 1983, Map Index No. 805). This very deep, somewhat poorly drained soil is on flood plains and is formed in alluvium derived from mixed rock sources. Typically, the surface layer is gray sandy loam about 12 inches thick. The upper 18 inches of the underlying material is gray, stratified sandy loam through silty clay loam. The lower part, to a depth of 60 inches, is a pale-brown, stratified, gravelly sand through very gravelly sandy loam. Depth to the gravelly material ranges from 30 to 40 inches. Permeability of the Truckee soil is moderately slow in the upper part of the underlying material and rapid in the lower part.

The Vamp silt loam, strongly saline-alkali, covers the southern half of the airport and adjacent areas (Baumer, 1983, Map Index No. 911). This



SOURCE: ORNL/ETS, 1994

FIGURE 3-2

F:\HOME\SHARON\RENO\NEWRENO\FIG3-2TB.DWG

GENERALIZED SOILS MAP
FOR THE BASE
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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is a moderately deep, somewhat poorly drained soil found on flood plains and terraces. The soil is formed in alluvium and is derived from mixed rock sources. Typically, the surface layer is grayish-brown silt loam about 3 inches thick. Below this is a layer of light grayish-brown and pale-brown, stratified, fine sandy loam and loam about 33 inches thick. The next layer is white, strongly-cemented hardpan about 6 inches thick, which is underlain to a depth of 60 inches by yellowish-brown and light olive-gray, stratified loam, sandy loam, and loamy sand. Depth to the hardpan ranges from 20 to 40 inches. Permeability of the Vamp soil is moderate. A seasonal high water table is at a depth of 30 to 40 inches in spring and early summer.

Channeling and deposition are common along stream banks in both soil units. The risk of corrosion is high for uncoated steel and concrete structures because both soil units are strongly saline and alkaline-affected. Both soil units are subject to seasonal flooding that has been controlled around the Base by deepened drainage ditches.

3.5 Hydrology

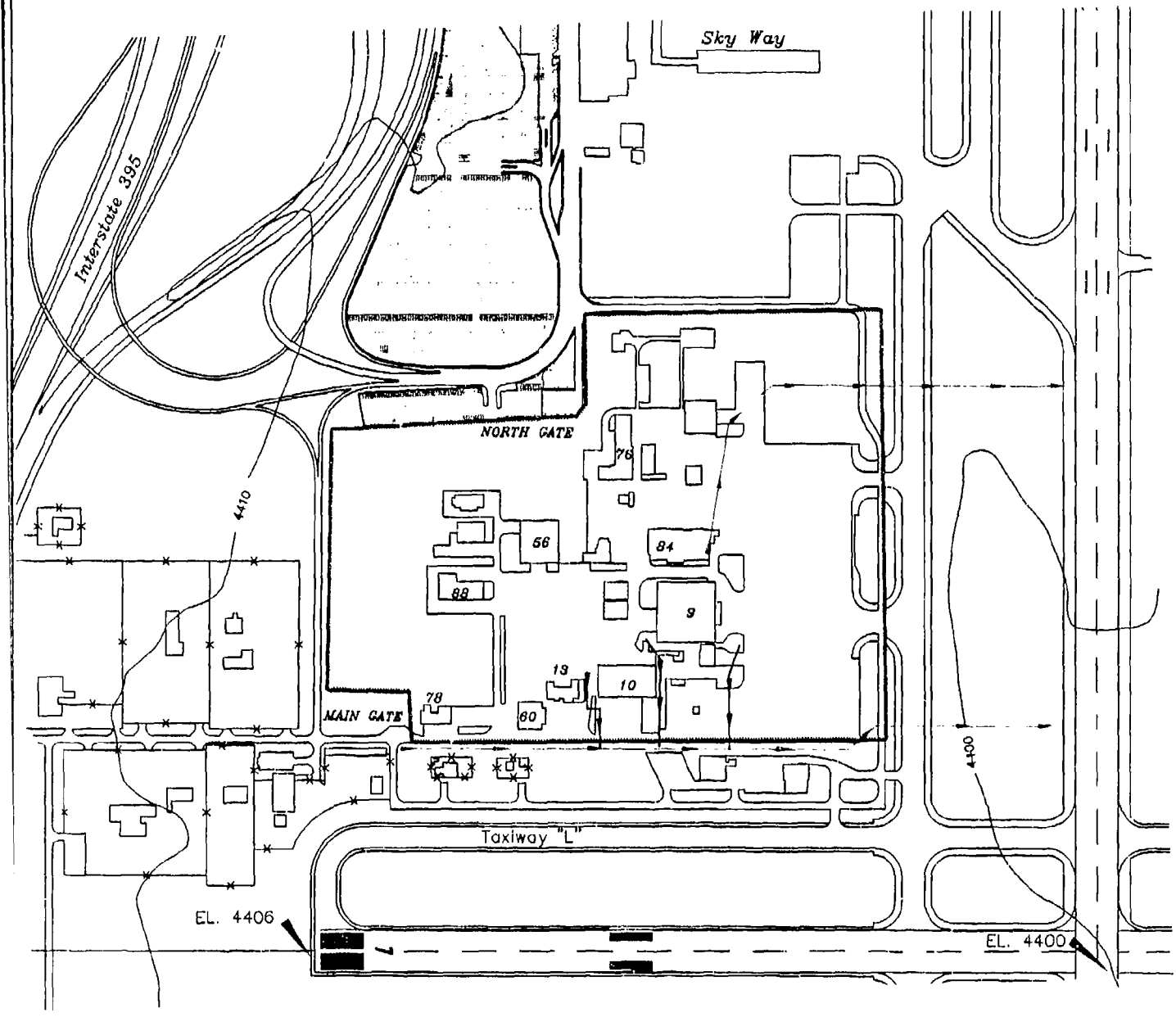
The following subsections describe the surface water hydrogeology and the hydrogeology of the NVANG Base.

3.5.1 Surface Water Hydrology

Surface water in the vicinity of the Base occurs in both open and covered drainage ditches. Irrigation ditches fed by diversion dams on the Truckee River pass by the Base just east of the airfield. There are drainage ditches along the north and south sides of the Base (Figure 3-3) that conduct water to the east, across the airfield, and into Boynton Slough, which drains into Steamboat Creek (ASG, 1989).

The Truckee Meadows is drained by the Truckee River, which flows from west to east through the meadows (Figure 3-4). The Base lies 1.5 miles south of the river channel at its closest point. Steamboat Creek, the major tributary to the Truckee River within the Meadows, enters through Pleasant Valley to the south and flows north to the Truckee River. Other streams in this area flow mainly during spring runoff (ASG, 1989).

The Truckee River supplies 85 percent (68,000 acre-feet) of the water used in the Reno-Sparks area. The remaining water demand (12,000



4400 TOPOGRAPHIC CONTOUR, ft

BASE BOUNDARY

SURFACE WATER DRAINAGE PATHWAY (UNCOVERED)

SURFACE WATER DRAINAGE PATHWAY (COVERED)

N.

FEET
0 100 200 300 400 500
0 30 60 90 120 150
METERS

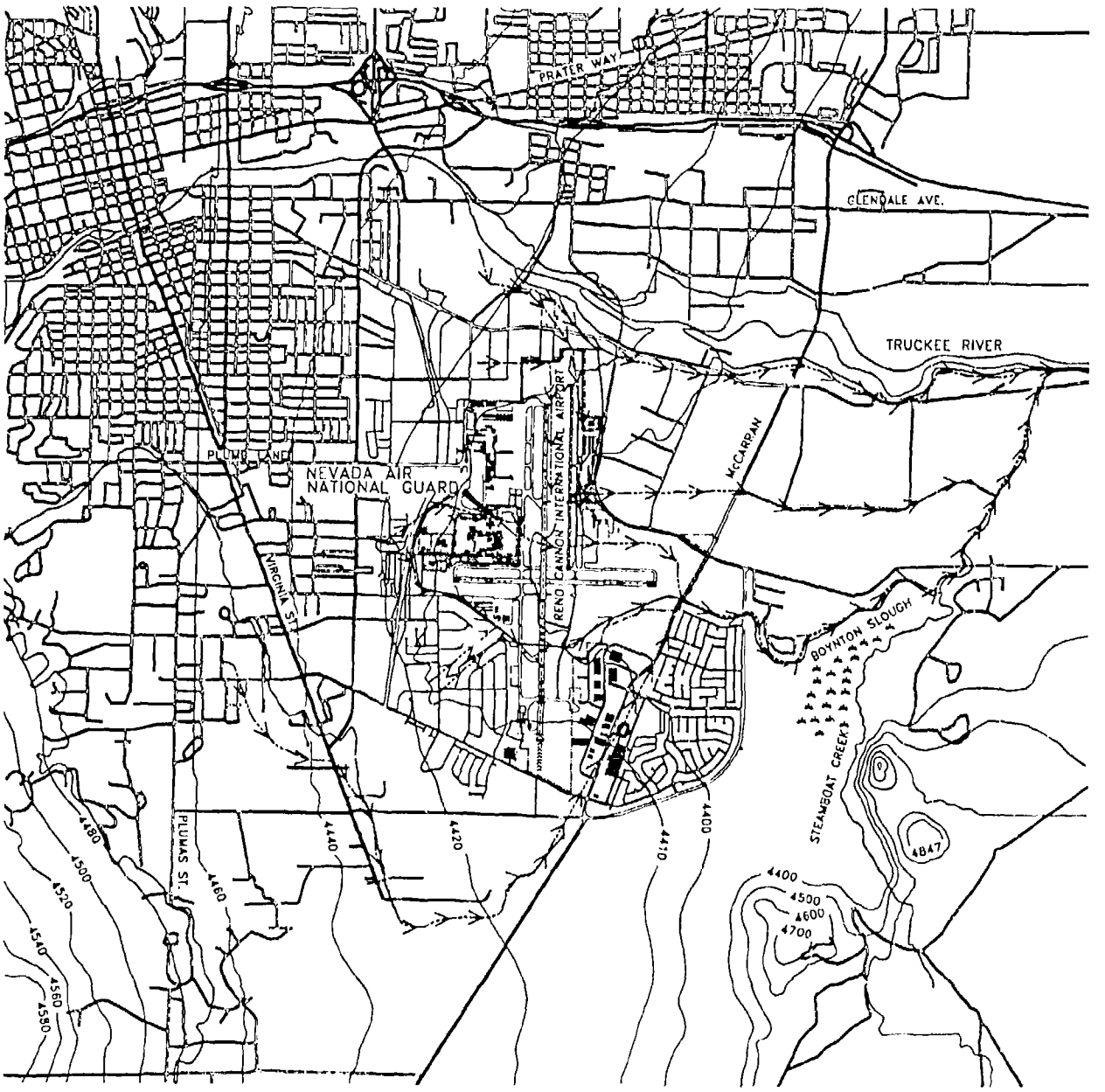
SOURCE: ORNL/ETS, 1994

FIGURE 3-3

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SURFACE WATER DRAINAGE MAP FOR THE BASE
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM



SOURCE: ORNL/ETS, 1994

FIGURE 3-4

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SURFACE WATER DRAINAGE FOR THE RENO, NEVADA AREA

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

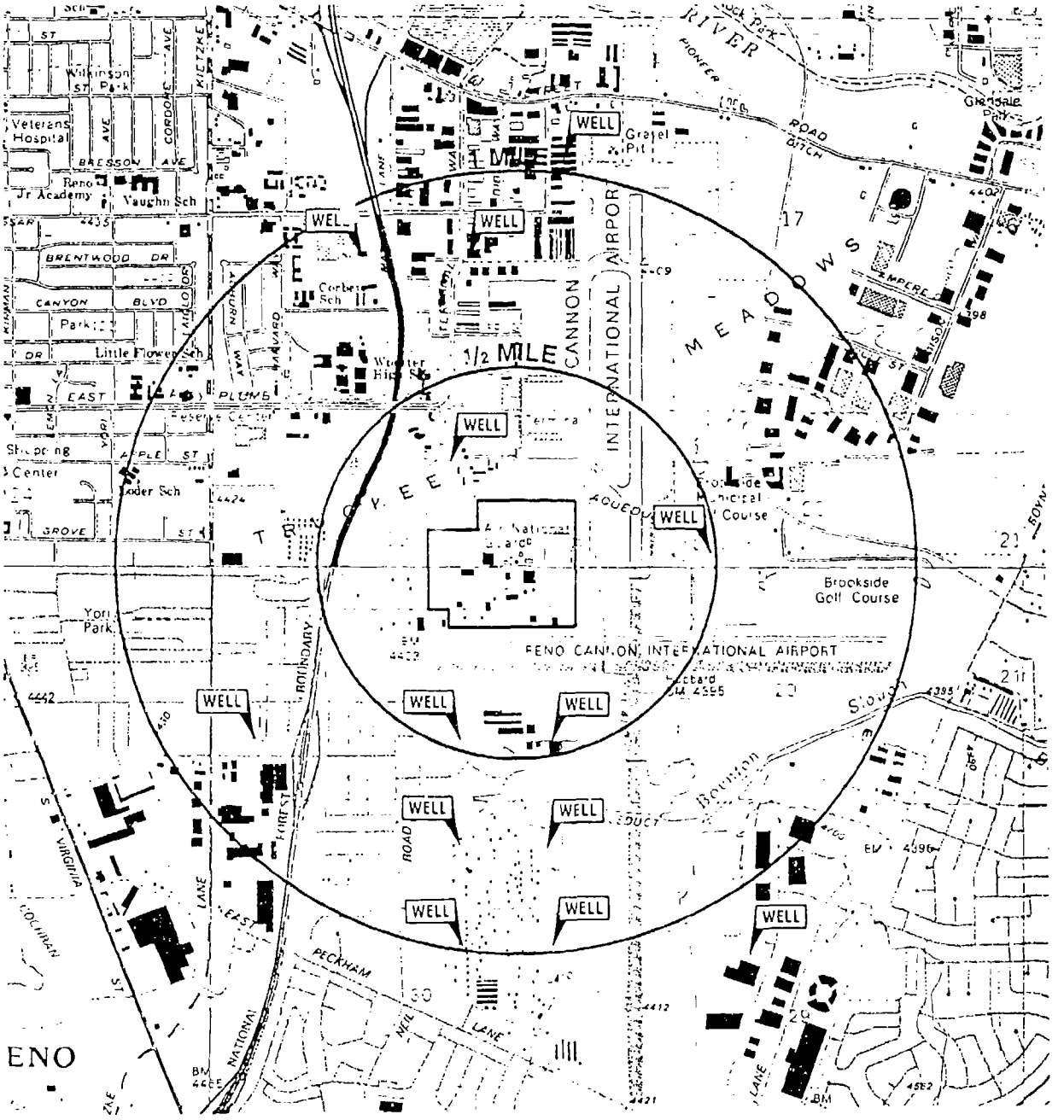
acre-feet) is supplied by several wells in the Truckee Meadows (ASG, 1989).

3.5.2 Hydrogeology

The potentiometric surface at the base can be as shallow as 3 feet below the land surface. The fine-grained nature of the upper sediments compared with the more permeable lower sediments may result in confined conditions across the Base. The proximity of the ground water surface to the land surface is due to the area's function as a ground water discharge point for the Truckee Meadows. Much of the Base and airport lie on former swampland that was filled in and drained with ditches that receive the current ground water discharge. Cohen and Loeltz (1964) estimated the total ground water discharge into the drainage ditches, drains, and sloughs east of the airport to be 6,500 acre-feet per year (acre-feet/year) with an additional 2,200 acre-feet/year discharged to drains immediately north of the airfield. Today, the only remaining swamp-land, located east of the Base, is found south of the confluence of Boynton Slough and Steamboat Creek.

Ground water in the Truckee Meadows occurs under both artesian and water table conditions in the unconsolidated and partially consolidated younger and older alluvium of the valley fill. Artesian heads in the meadows area are commonly less than 20 feet above the land surface (Cohen and Loeltz, 1964). Depths to ground water vary considerably due to the interfingering nature of the valley-fill deposits. Several public water supply wells located in the meadows are screened at depths ranging from 274 to more than 800 f (Figure 3-5). Commonly, wells located several yards apart will tap ater bearing deposits at different depths. This trend becomes more pronounced in the area of the Truckee River where channel shifts have left discontinuous and sinuous gravels (ASG, 1989).

Review of Nevada Department of Water Resources drilling records, stored by the United States Geological Survey Water Resources Division in Carson City, Nevada, indicate that there are 90 monitoring wells within a 1-mile radius of the NVANG. None of these wells are considered private supply wells as they are less than 30 feet deep and constructed as monitoring wells related to environmental site assessments in the airport area. Because shallow ground water in this area contains high concentrations of naturally occurring inorganic compounds, there are no known private drinking water wells near the NVANG.



SOURCE: U.S.G.S. 7 1/2' QUADRANGLE MAPS

FIGURE 3-5

PUBLIC SUPPLY WELLS IN THE VICINITY OF THE NVANG BASE

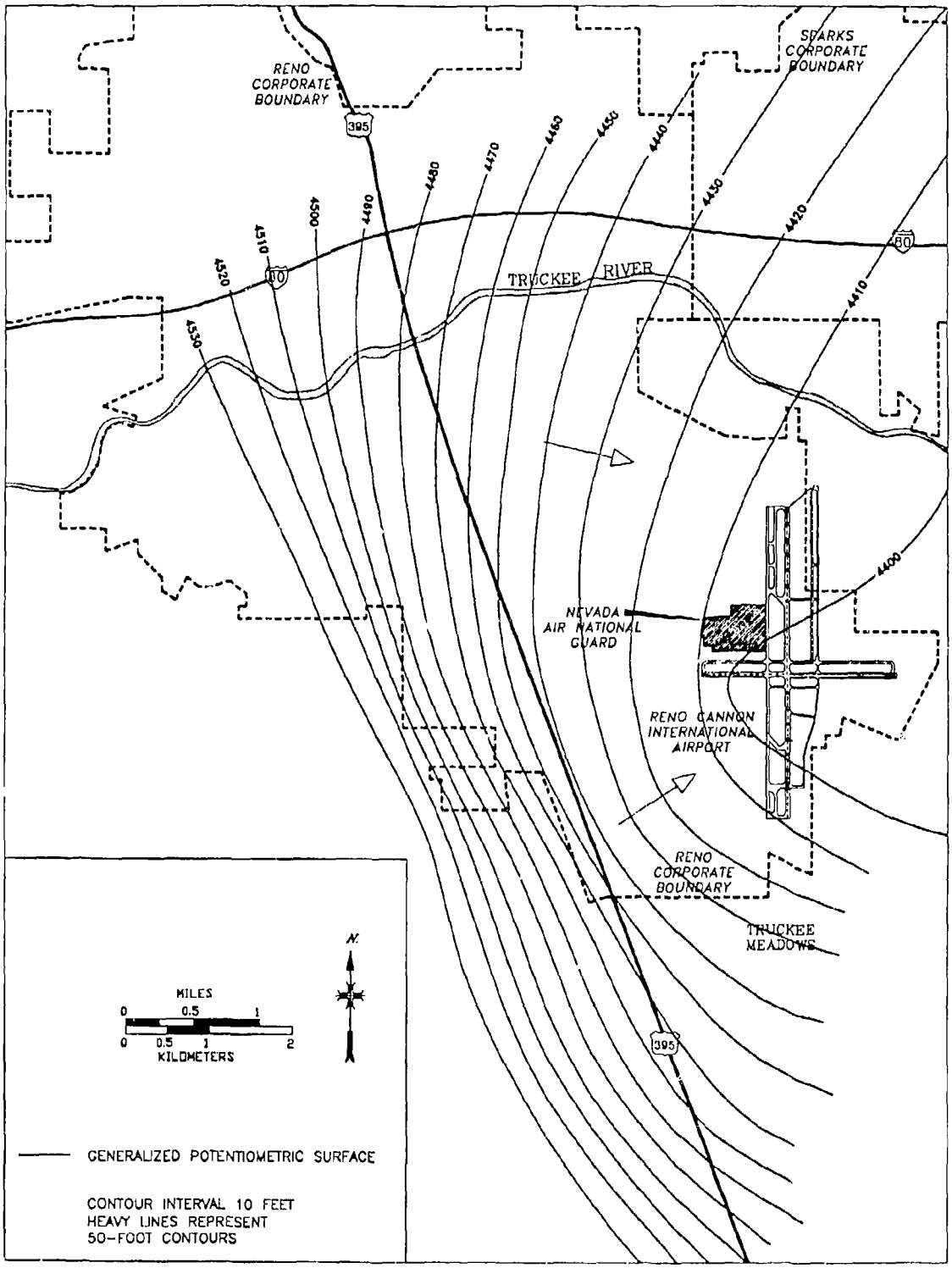
152nd TACTICAL RECONNAISSANCE GROUP

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Cohen and Loeltz (1964) suggest that 70 percent of the recharge to the ground water in the Truckee Meadows is from infiltration by crop irrigation practices and 30 percent can be attributed to the infiltration of streamflow and underflow from tributary valleys. Increasing urbanization in the meadows, however, has decreased the use of crop irrigation, thus decreasing the rate of recharge and consequently lowering water levels. The state engineer's office in Carson City estimates the present annual ground water recharge to the Truckee Meadows at 20,000 to 25,000 acre-feet.

Basic ground water flow gradients and flow direction in the Truckee Meadows and vicinity of the Base are illustrated in Figure 3-6.



SOURCE: ORNL/ETS, 1994

FIGURE 3-6

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POTENTIOMETRIC MAP OF THE
RENO, NEVADA AREA
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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SECTION 4.0

FIELD PROGRAM

4.1 Summary

This section summarizes the elements of the RI field program. Deviations from the workplans and methods to handle investigation-derived waste are also presented. This section describes the activities conducted during the RI at the NVANG Base. The results of these investigations are presented and discussed in Section 5.0.

Field investigations were conducted at IRP Sites 4, 5, 7, and 14. Memoranda for field activities is included in Appendix A. Table 4-1 contains a summary of the field activities and the dates at which they were conducted. Field activities at each site consisted of the following:

- Drilling soil borings to collect soil samples for field screening and laboratory analysis;
- Installing monitoring wells to collect ground water samples for laboratory analysis; and
- Monitoring ground water, including ground water level measurement, collecting field samples for analysis of ground water field parameters (pH, conductivity, temperature), and collecting samples for laboratory analysis.
- Performing a location and elevation survey of all soil borings and monitoring wells drilled as part of the RI.

In addition to the above activities, the following activities were conducted at IRP Site 7 - POL Storage Area as part of product removal activities:

- Surface geophysical survey using a magnetometer and ground penetrating radar to locate the surface extent of four USTs and associated piping at IRP Site 7 - POL Storage Area, and the extent of the excavated area around the tanks;
- Installation of floating product thickness monitoring and floating product recovery wells; and

TABLE 4-1

Summary of Remedial Investigation Activities
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Date(s)	Installation Restoration Program Site(s)	Work Performed
October 17, 1994		Remedial Investigation/Feasibility Study Kickoff Meeting held at Nevada Air National Guard Base, Reno, Nevada
April 17, 1995		Submit Final Workplan for Remedial Investigation/Feasibility Study
May 12 to 14 , 1995	4, 5, 7, 12, and 14	Perform preliminary ground water sampling round
May 15 to 18, 1995	4	Drill and sample seven borings and install two monitoring wells
May 16, 1995	7	Perform geophysical survey in vicinity of underground storage tanks
May 18, 1995	7	Install two borings to assess product thickness
May 19 to 20, 1995	7	Drill and sample eight soil borings and install one monitoring well
May 21 to 22, 1995	5	Drill and sample four soil borings and install two monitoring wells
May 22, 1995	7	Drill and sample one soil boring
May 23 to 24, 1995	7	Drill and sample four borings, install three product monitoring wells, and install one product recovery well
May 24 to 25, 1995	14	Drill and sample five soil borings
May 25 to 26, 1995	4, 5, 7, 12, and 14	Perform ground water sampling round
July 12 to 13, 1995	4, 5, 7, 12, and 14	Resample seven monitoring wells
August 21 to 25, 1995	4, 5, 7, 12, and 14	Perform ground water sampling round
November 13 to 17, 1995	4, 5, 7, 12, and 14	Perform ground water sampling round

- Product thickness measurement; and
- Product recovery and removal.

4.2 Deviation from the Workplan

Some deviations from ERM's RI/FS Workplan (April 1995) were necessary due to field conditions or findings during performance of the work. The deviations are listed below.

- Additional borings were drilled at the following IRP sites based on findings of field screening activities: Site 4 - Former FTA, one additional boring; Site 7 - POL Storage Area, four additional borings; and Site 14 - OWS, one additional boring.
- ERM was unable to collect soil samples from Site 14 - OWS soil boring SB14-4 due to presence of a subsurface obstruction. This obstruction may have been a part of the oil/water separator at the site.
- Monitoring wells MW28 and MW29 were drilled approximately 35 feet due west of the originally planned locations at Site 4 - Former FTA. This was due to the presence of subsurface utility corridor and roadway in the area where the original drilling locations were planned.
- The location of monitoring well MW30 was moved approximately 20 feet north of the originally planned location to the presence of an addition to Building 76.
- One additional monitoring well (MW32) was added at Site 5 - Former FTA. The purpose of the monitoring well MW32 was to replace monitoring well MW19, a destroyed monitoring well that was formerly located upgradient of Site 5.
- One additional product monitoring well (T-3) was added at Site 7 - POL Storage Area. This monitoring well was installed at the same location as soil boring SB7-5 based on the discovery of free product during drilling.
- Monitoring wells MW04 and MW05 were not sampled during the pre-drilling sampling round (prior to the start of drilling activities) because the wells could not be located based on surface inspection

alone. ERM utilized a metal detector to locate the wells and they were sampled at the same time as the initial sampling round for RI monitoring wells.

- Monitoring well MW24 also could not be sampled during the pre-drilling sampling round due to the presence of an obstruction in the casing. The obstruction was cleared and the well was sampled at the same time as the initial sampling round for RI monitoring wells.

- The analytical laboratory experienced quality control problems during VOC analysis of ground water samples collected during the initial sampling round for new monitoring wells. ERM resampled these monitoring wells in July 1995, with the exception of monitoring well MW31. This monitoring well was inadvertently not resampled.

4.3 Field Screening Activities

The following sections describe field screening activities conducted during the RI, including a surface geophysical survey using a magnetometer and ground penetrating radar, and field screening of soil samples using a portable field gas chromatograph (GC).

4.3.1 Geophysics

Spectrum E.S.I. of San Fernando, California, performed a geophysical survey of the immediate vicinity of the four USTs located at Site 7 - POL Storage Area. The purpose of the survey was to locate the above ground extent of the gravel backfill within the excavation in which the USTs were located. The survey was performed using ground penetrating radar and magnetometer methods.

4.3.2 Field Gas Chromatograph (GC)

4.3.2.1 Methods. A Photovac Model 10S Plus portable GC was used to screen soil and ground water samples prior to shipment to the laboratory for analysis. Table 4-2 provides a summary of samples analyzed using the field GC.

Three soil samples from each borehole with the highest VOC concentrations as determined by the field GC were sent to the laboratory for analysis. The portable GC included a photoionization detector (PID) with 10.6 electron volt electrodeless discharge tube. The carrier gas used was ultra-pure, zero grade air.

TABLE 4-2

Summary of Soil Samples Collected for Chemical Analysis
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Installation Restoration Program Site	Boring Identifiers	Lab Analyses (EPA Method)	Original Samples	Number of Quality Assurance/Quality Control Samples						Total*
				Trip Blanks	Equipment Blanks	Field Blanks	Field Duplicates	MS/MSD	Designated for Data Validation	
Site 4	SB4-1 through SB4-7	VOCs (8240), SVOCs (8270), TPH (8015 Modified)	21	2	1	1	2	1		23
		Field GC	30							30
Site 5	SB5-1 through SB5-4	VOCs (8240), SVOCs (8270), TPH (8015 Modified)	10	1		1	1	1		11
		Field GC	13				1			14
Site 7	SB7-1 through SB7-12	VOCs (8240), SVOCs (8270), TPH (8015 Modified)	35	3	2	2	5	3	7	40
		Field GC	44				4			48
Site 14	SB14-1 through SB14-5	VOCs (8240), SVOCs (8270), TPH (8015 Modified)	8	1	1	1	1			9
		Field GC	12							12

VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
TPH = total petroleum hydrocarbons
MS/MSD = matrix spike/matrix spike duplicate
EPA = Environmental Protection Agency
* = blank samples, MS/MSD sample, and samples designated for data validation not included in total
GC = gas chromatograph

Initially the field GC was calibrated by injecting three different standards. The standards were prepared using a mixture of commercially available BTEX (benzene, toluene, ethylbenzene, m-xylene, p-xylene, and o-xylene), TCE and tetrachloroethylene (PCE) solutions in methanol and American Standards for Testing and Materials (ASTM) Type I water. Three standards were prepared each day: 10, 50, and 500 µg/l BTEX, TCE, and PCE standards, respectively. The standard solutions were prepared in 40-milliliter glass vials with septa. Approximately 20 milliliters of each standard solution were prepared. The standard solutions were shaken vigorously for more than 1 minute to ensure that the VOCs could partition into the headspace of the vials. A syringe was used to collect a headspace sample through the septum and to inject the headspace sample into the field GC.

After the initial calibration, new standards were prepared each day. Routine startup procedures included running machine blanks using zero air, syringe blanks, method blanks, and the three standards.

Chromatographs generated for the sample were compared to chromatographs generated for the standards that bracketed the run. VOCs were identified by comparing the relative retention times of compounds detected in the sample with those detected in the standards. The response areas of each detected compound in the sample were compared to those of the standards to calculate the concentrations of each VOC in the sample.

In a large number of samples, compound identification and compound concentration calculation relative to the standards were uncertain. This was due to the presence of a large number of unidentified compounds in the samples. Using the chromatographs, samples that did not contain any or very low concentrations of VOCs could be differentiated from samples that contained moderate and high concentrations of VOCs. For compounds with moderate and high concentrations, the individual compounds and their concentrations could not be determined with any level of certainty. The chromatographs and the general area of the response were used as a relative measure of the concentration of VOCs in the samples and as the criteria for sample selection for laboratory analysis. The field GC results recorded on the boring logs included in Appendix D reflect the totals of compounds (BTEX, TCE, and PCE) detected in each sample. These numbers were used as a general indication of the volatile compound content of the samples. Field notes for field GC operations and chromatographs for each day of GC operation are included in Appendix B.

4.3.2.2 Soil Sample Analysis. Soil samples collected in brass sleeves were stored in an ice chest prior to analysis. Approximately 10 grams of soil were transferred into a 40-milliliter glass vial with a septum containing approximately 15 milliliters of ASTM Type I water. The field GC operator verified that headspace volume in the sample vials was similar to headspace in the vials containing the standards. The weight of the soil in the vial was recorded in the field notebook. The sample was labeled and shaken vigorously for more that 2 minutes to ensure that the VOCs in the soil and water solution could partition into the headspace of the vial. A syringe was used to collect the headspace sample through the septum and to inject it into the field GC. The volume of the injected headspace sample ranged from 5 to 100 microliters (µl) depending on the expected volatile concentration in the sample based on PID screening and prior knowledge of the site.

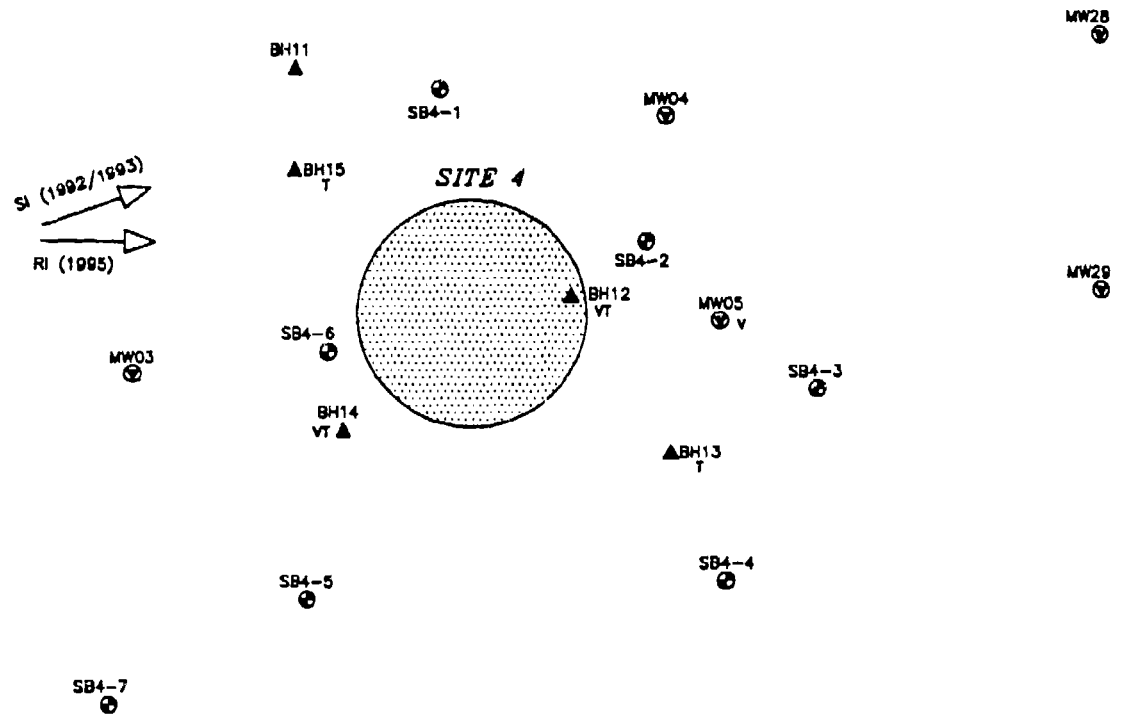
4.3.2.3 Ground Water Selected Sample Analysis. Ground water samples were also analyzed using the field GC. The samples were collected in 40-milliliter glass vials with septa and were stored in an ice chest. Prior to field GC analysis, approximately 20 milliliters of the ground water sample was transferred into a labeled 40-milliliter glass vial with septum. The field GC operator verified that the headspace volume in the sample vial was similar to the headspace in the vials containing the standards. The sample vial was then shaken vigorously for more than 1 minute to ensure that the VOCs in the ground water could partition into the headspace of the vial. A syringe was used to collect the headspace sample through the septum and to inject it into the field GC. The volume of the injected headspace sample ranged from 50 to 200 µl depending on the expected volatile concentration in the sample based on prior knowledge of the site.

4.4 Confirmation Activities

The following sections describe soil boring, soil sampling, well installation, and ground water sampling activities conducted during the RI.

4.4.1 Soil Borings

Soil borings were drilled to collect soil samples for confirmation analysis for each site under investigation. Soil samples were collected and analyzed to determine the lateral and vertical extent of soil contamination at each site. Table 4-2 provides a summary of soil samples collected for chemical analysis. Soil borings drilled during RI activities are shown on Figures 4-1 through 4-4.

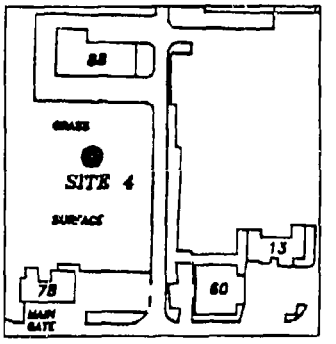


EXPLANATION

- ORIGINAL IRP SITE
- MW05 — MONITORING WELL LOCATION
- SB4-4 — SOIL BORING LOCATION
- BH14 — SOIL BORING – SITE INVESTIGATION
- GROUND WATER FLOW DIRECTION
- V — VOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS
- T — TOTAL PETROLEUM HYDROCARBONS DETECTED ABOVE CLEANUP GOALS

0 15 30

FEET



LOCATION MAP

FIGURE 4-1

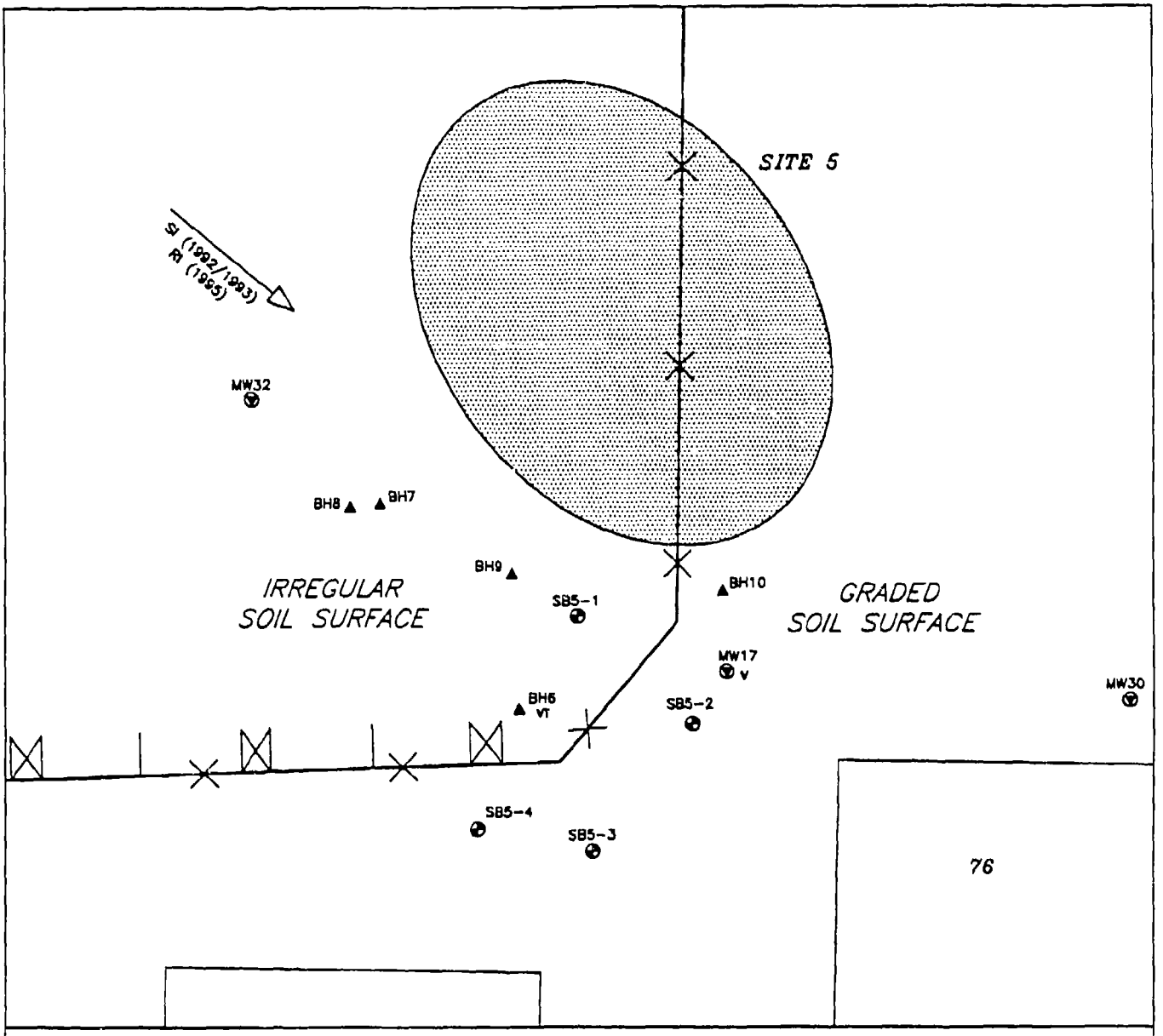
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IRP SITE 4 – FORMER FTA, MONITORING WELLS AND SOIL BORINGS

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EXPLANATION

- ORIGINAL IRP SITE
- MW17 — MONITORING WELL LOCATION
- SB5-4 — SOIL BORING LOCATION
- BH7 — SOIL BORING – SITE INVESTIGATION
- GROUND WATER FLOW DIRECTION
- V — VOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS
- T — TOTAL PETROLEUM HYDROCARBONS DETECTED ABOVE CLEANUP GOALS

0 15 30

FEET

FIGURE 4-2

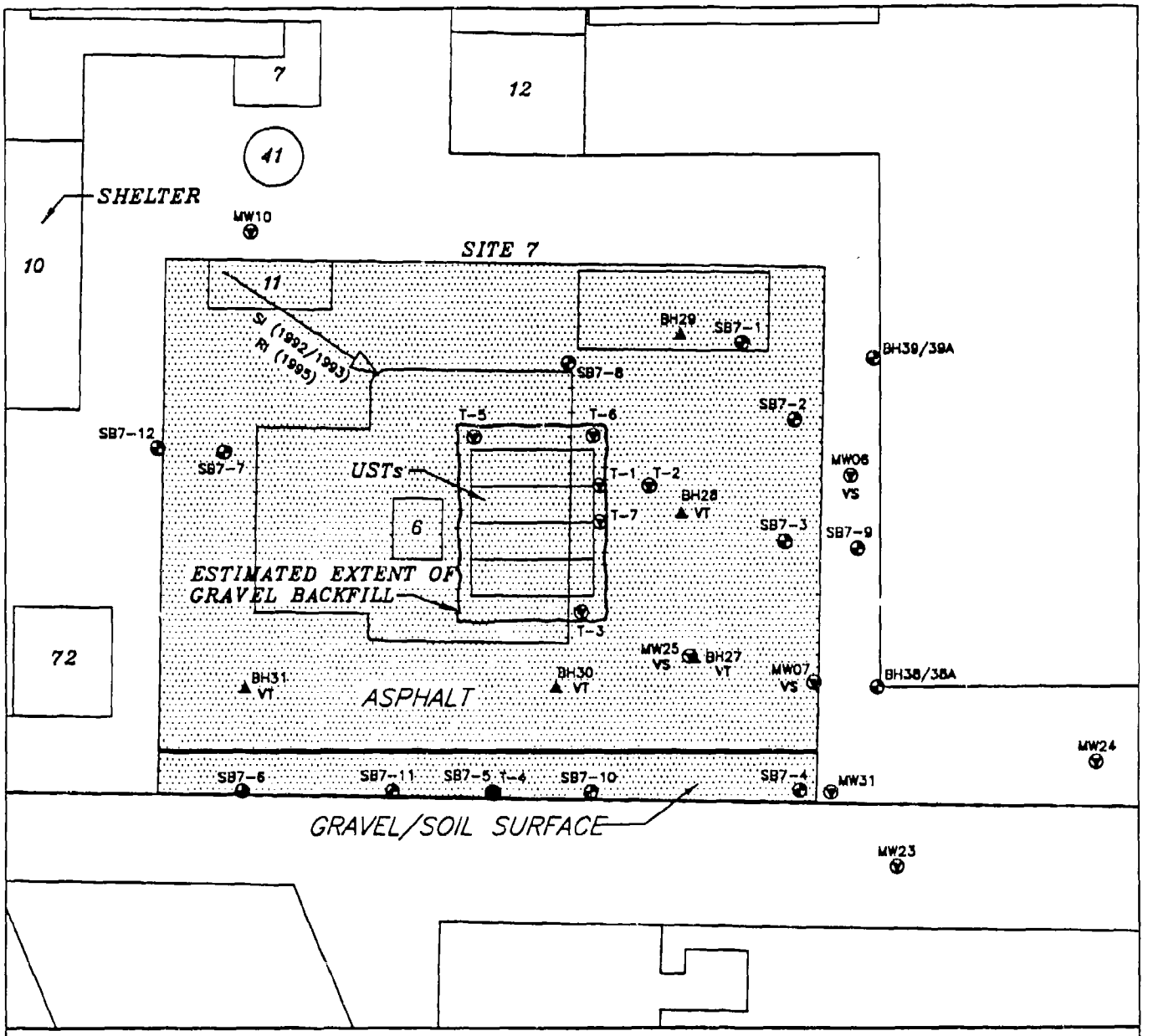
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IRP SITE 5 – FORMER FTA, MONITORING WELLS AND SOIL BORINGS

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EXPLANATION

- BASE BOUNDARY
- ORIGINAL IRP SITE
- MS25 — MONITORING WELL LOCATION
- SB7-11 — SOIL BORING LOCATION
- BH31 — SOIL BORING – SITE INVESTIGATION
- GROUND WATER FLOW DIRECTION
- V — VOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS
- S — SEMIVOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS
- T — TOTAL PETROLEUM HYDROCARBONS DETECTED ABOVE CLEANUP GOALS

N

0 30 60

FEET

FIGURE 4-3

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IRP SITE 7 – POL STORAGE AREA, MONITORING WELLS AND SOIL BORINGS

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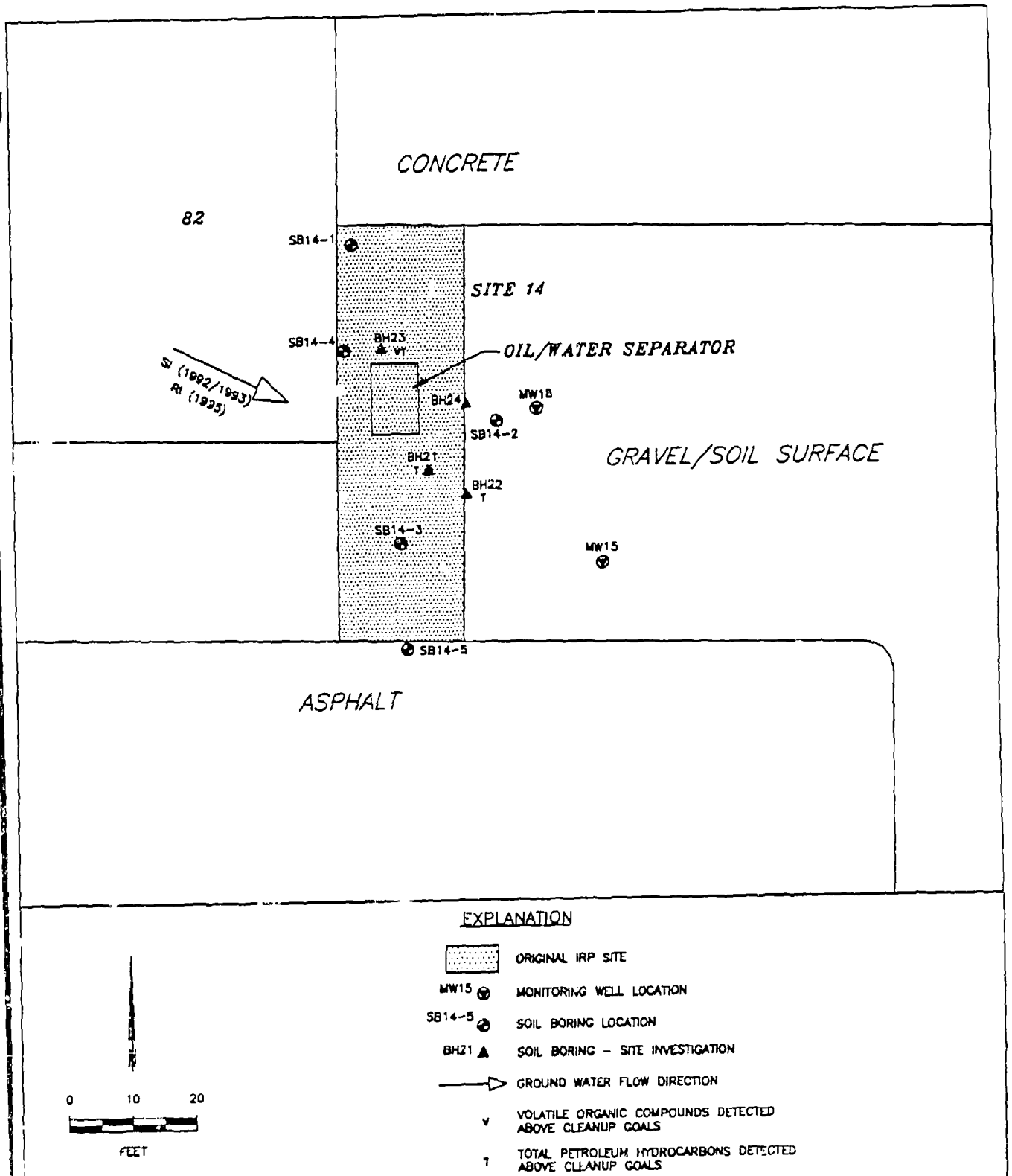


FIGURE 4-4

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IRP SITE 14 - OWS, MONITORING WELLS AND SOIL BORINGS

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Soil borings were drilled using the hollow-stem auger method, and continuous drive samples were collected using a 2-foot-long stainless steel split-spoon drive sampler equipped with four 6-inch-long brass sleeves. Soil borings were terminated at the top of the water table at investigation sites where unconfined or water table conditions occurred, or at the bottom of the confining layer at investigation sites where confined conditions occurred. All soil samples were collected in the unsaturated zone.

Soil samples in each drive sampler were field screened using a PID. The ends of the two bottom-most brass sleeves were then covered with Teflon and fitted with a plastic cap. The bottom-most brass sleeve was stored in an ice chest for potential shipment to the laboratory for analysis. The second sleeve from the bottom was field screened using a field GC.

Field screening results were used to determine the samples to be sent for laboratory analysis. In general, three samples from each soil boring were submitted for laboratory analysis. If the results of the field screening did not clearly target a specific interval for laboratory analysis, samples collected from immediately below the surface fill material, from the middle of the borehole, and from the bottom of the borehole were submitted for laboratory analysis.

The third brass sleeve from the bottom of the sampler was used for lithologic logging, and the uppermost brass sleeve was discarded due to the potential presence of slough material. Lithologic logs are included in Appendix C.

4.4.2 Well Installation

Ground water monitoring wells installed during the RI field activities were for the purpose of defining the lateral extent of ground water contamination at the IRP sites. A summary of well construction details is provided in Table 4-3. A total of five ground water monitoring wells, three product thickness monitoring wells, and one product recovery well were installed (Figures 4-1 through 4-4). All wells were drilled using the hollow-stem auger drilling method. With the exception of the product recovery well T-3, 8-inch outer diameter (OD) hollow-stem augers were used for drilling. Fifteen-inch OD hollow-stem augers were used to drill the product recovery wells.

Threaded, flush-joint, 2-inch schedule 40 PVC casing and screen were used for the construction of the monitoring wells. Threaded, flush-joint, 6-inch schedule 80 PVC casing and screen were used for the

TABLE 4-3

Monitoring Well Installation Summary
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	IRP Site No.	Date Completed	Measuring Point Elevation, ft msl	Total Depth of Borehole, ft bgs	Screened Interval, ft bgs	Top of Filter Pack, ft bgs	Depth to Water, ft bmp (date)	Water Level Elevation, ft msl	Product Thickness, feet (date)
MW02	Background	11/12/92	4404.62	20.5	7 to 17	5.0	4.72 (5/15/95)	4399.90	
MW03	4	11/13/92	4404.38	18.5	6 to 16	4.0	6.72 (5/14/95)	4397.66	
MW04	4	11/13/92	4403.69	18.0	6 to 16	4.5	5.83 (5/25/95)	4397.86	
MW05	4	11/13/92	4403.61	13.0	6 to 11	4.5	5.65 (5/24/95)	4397.96	
MW06	7	11/14/92	4398.69	16.0	4.5 to 14.5	2.5	4.44 (5/13/95)	4394.25	
MW07	7	11/14/92	4397.90	14.5	4 to 14	3.0	3.94 (5/13/95)	4393.96	Trace (5/13/95)
MW08	2	11/15/92	4399.21	16.0	4 to 14	3.0	4.78 (5/13/95)	4394.43	
MW09	2	11/15/92	4401.97	16.0	4 to 14	3.0	6.12 (5/15/95)	4395.85	
MW10	7	11/16/92	4400.79	16.0	3 to 13	2.5	5.38 (5/14/95)	4395.41	
MW11	2	11/16/92	4400.09	16.0	4 to 14	3.0	4.98 (5/15/95)	4395.11	
MW12	13	11/17/92	4402.50	18.5	6 to 16	4.0	5.97 (5/15/95)	4396.53	
MW13	13	11/17/92	4402.48	18.0	6 to 16	4.0	5.84 (5/15/95)	4396.64	
MW14	13	11/17/92	4402.13	16.0	5.5 to 15.5	4.0	5.66 (5/15/95)	4396.47	
MW15	14	11/18/92	4402.77	14.5	3.5 to 13.5	3.0	6.72 (5/12/95)	4396.05	
MW17	5	11/18/92	4402.50	15.0	4 to 14	3.0	5.87 (5/12/95)	4396.63	
MW18	14	11/19/92	4402.57	16.5	4.5 to 14.5	3.0	6.47 (5/12/95)	4396.10	
MW23	7	12/1/92	4399.40	18.0	5 to 15	3.0	5.67 (5/14/95)	4393.73	
MW24	7	12/2/92	4398.67	16.0	5 to 15	3.0	4.75 (5/25/95)	4393.92	
MW25	7	12/5/92	4397.78	14.5	3 to 13	1.5	3.90 (5/13/95)	4393.88	Trace (5/13/95)
MW26	12	11/3/93	4397.63	15.0	5 to 15	3.0	4.64 (5/12/95)	4392.99	
MW27	12	11/2/93	4397.32	15.0	5 to 15	3.0	3.22 (5/13/95)	4394.10	
MW28	4	5/18/95	4404.03	18.5	8 to 18	5.0	6.48 (5/24/95)	4397.55	
MW29	4	5/18/95	4404.05	18.5	8 to 18	5.0	6.30 (4/24/95)	4397.75	
MW30	5	5/22/95	4404.48	19.0	8 to 18	5.0	7.27 (5/25/95)	4397.21	
MW31	7	5/20/95	4398.51	19.0	8 to 18	5.0	4.39 (5/25/95)	4394.12	
MW32	5	5/24/95	4401.89	19.0	8 to 18	5.0	4.68 (5/24/95)	4397.21	
T-1	7	5/23/95	4399.50	11.0	3 to 11	2.0	NA NA	NA	5.51* (5/19/95)
T-2	7	5/23/95	4399.29	14.0	3 to 13	2.0	NA NA	NA	0.10 (5/19/95)
T-3	7	5/23/95	4399.00	15.5	4 to 14	3.0	NA NA	NA	5.68 (5/26/95)
T-4	7	5/24/95	4398.32	19.0	8 to 18	5.0	NA NA	NA	0.07 (5/26/95)

ft msl = feet above mean sea level
ft bgs = feet below ground surface
ft bmp = feet below measuring point
* = minimum product thickness; product-water interface not encountered
NA = not available

product recovery well. PVC well caps of the same diameter were used to cap the casing. The screen consisted of threaded, flush-joint pipe with 0.010-inch slot size.

The annular space between the well screen and the borehole wall was backfilled with clean, well-graded, silica sand. The silica sand was installed to 1 to 3 feet above the screened interval. A 1.5- to 3-foot bentonite slurry seal was installed above the sand pack. The remainder of the annular space to approximately 1 foot below ground surface was filled with bentonite-cement grout. All annular material was added through the augers. The PVC risers were sealed with expanding lockable plugs and finished with 8-inch ID protective steel casing with removable steel covers. The well covers were flush mounted with the ground surface and reinforced with a concrete apron. A typical construction diagram for monitoring wells installed during the RI is shown on Figure 4-5. Monitoring and product recovery well construction diagrams are included in Appendix D. Well logs are included in Appendix C.

At least 24 hours after well completion, ground water monitoring wells were developed using a 2-inch submersible pump. Ground water levels were monitored prior to the start of well development. An electric water level meter accurate to 0.01 feet was used for ground water level measurement from a marked point on the top of the well casing. Temperature, specific conductivity, and pH were monitored and recorded during well development. Approximately ten well volumes were purged until the clarity of the water had stabilized and until the temperature, specific conductivity, and pH had stabilized. If any potable water was added to the well during construction, it was ensured that at least three times the water added was removed during purging.

Product thicknesses were measured in monitoring wells using an interface probe either immediately prior to ground water sample collection (MW-series monitoring wells) or approximately 3 days after completion (T-series monitoring wells).

4.4.3 Ground Water Sampling

Ground water samples were collected from all ground water monitoring wells installed during the RI and from selected existing monitoring wells. Table 4-3 provides construction details for monitoring wells sampled during RI activities. Table 4-4 provides a summary of ground water samples collected for chemical analysis. Prior to sampling, at least three well volumes were evacuated using a

TABLE 4-4

Summary of Ground Water Samples Collected for Chemical Analysis
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Installation Restoration Program Site	Location Identifer	Lab Analyses (EPA Method)	Original Samples	Number of Quality Assurance/Quality Control Samples						Total*
				Trip Blanks	Equipment Blanks	Field Blanks	Field Duplicates	MS/MSD	Designated for Data Validation	
Site 4	MW03 MW04 MW05 MW28 MW29	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)	5	1	1	1	1		2	6
		Field GC	3							3
Site 5	MW17 MW30 MW32	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)	3	1	1			1	1	3
		Field GC	1							1
Site 7	MW06 MW07 MW10 MW23 MW24 MW25 MW31	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)	7	2	1	2	1			8
		Field GC	6				2			8
Site 14	MW15 MW18	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)	2	1			1			3
		Field GC	2				1			3
Additional Wells	MW08 MW26 MW27	VOCs (8240), SVOCs (8270), TPH (8015 Modified), Lead (7421)	3			1		1		3
		Field GC	3							3

VOCs = volatile organic compounds
SVOCs = semivolatile organic compounds
TPH = total petroleum hydrocarbons
MS/MSD = matrix spike/matrix spike duplicate
EPA = Environmental Protection Agency
GC = gas chromatograph
* = blank samples, MS/MSD sample, and samples designated for data validation not included in total

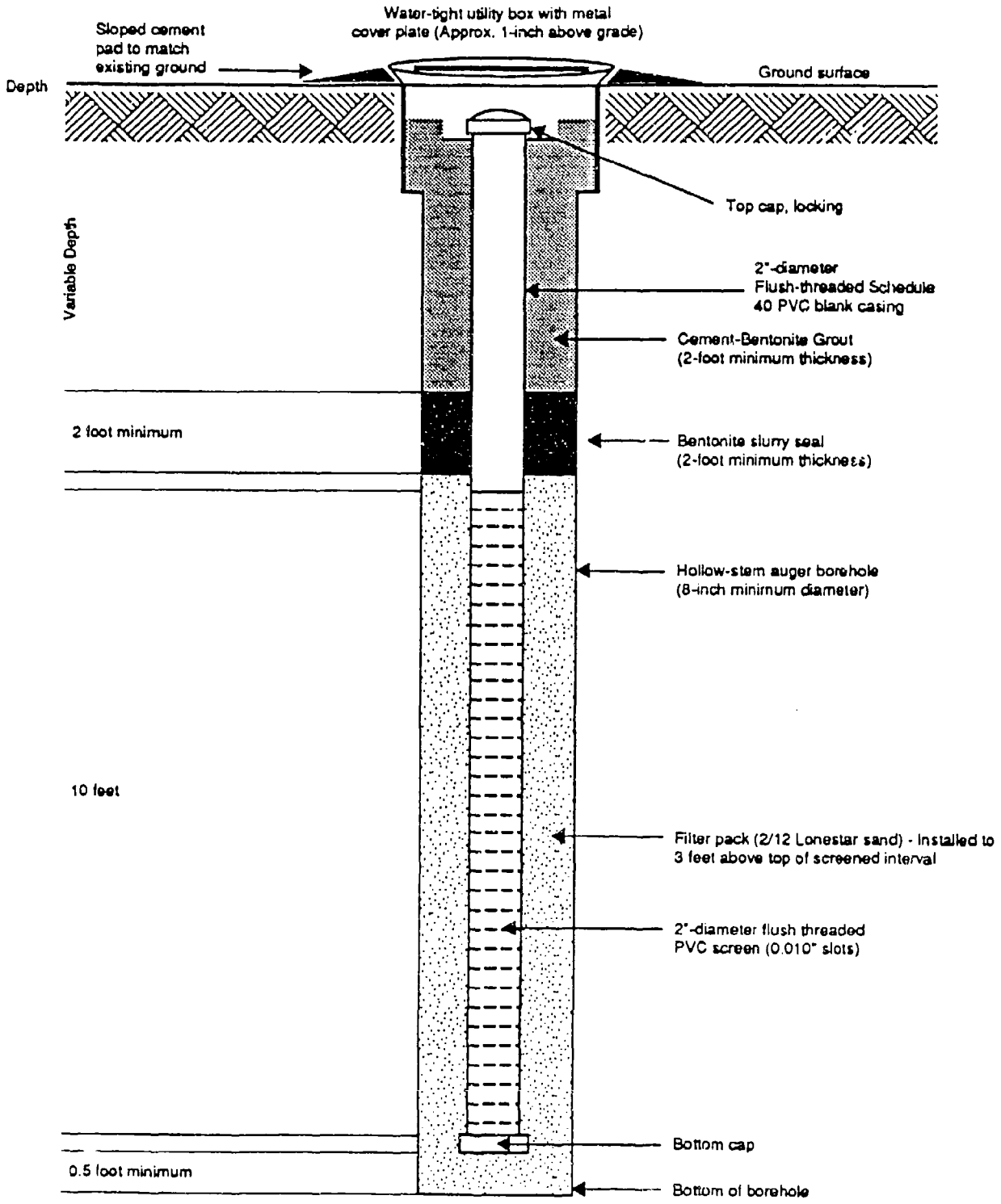


FIGURE 4-5

TYPICAL MONITORING WELL CONSTRUCTION

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

F:\HOME\SHARON\RENO\NEWRENO\FIG4-5TB.DWG

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2-inch submersible Rediflow 2 pump. Temperature, specific conductivity, and pH were measured and recorded during the purging process. Ground water samples were collected using disposable bailers.

Ground water samples for VOC analysis were collected in two hydrochloric acid-preserved, 40-milliliter glass vials with septa. Ground water samples for TPH, floating product, and fuel fingerprint analyses were collected in nonpreserved 40-milliliter glass vials with septa. Ground water samples for SVOC analysis were collected in two sodium-thiosulfate preserved, 1-liter amber glass bottles. Ground water samples collected for lead analysis were filtered in the field using a peristaltic pump and disposable filters. Lead samples were collected in 250-milliliter polyethylene bottles.

4.4.4 Specific Media Sampling

4.4.4.1 Subsurface Soil Sampling. Soil samples collected from soil borings drilled during the RI field work were analyzed for VOCs using EPA Method 8240, SVOCs using EPA Method 8270, and TPH using EPA Method 8015 Modified.

4.4.4.2 Ground Water Sampling. Ground water samples collected from soil borings drilled during the RI field work were analyzed for VOCs using EPA Method 8010/8020 and 8240 for confirmation of detected compounds, SVOCs using EPA Method 8270, TPH using EPA Method 8015 Modified, and lead using EPA Method 7420.

4.4.4.3 Product Sampling. Fuel hydrocarbon samples collected from product monitoring wells were analyzed for fuel fingerprint using EPA Method 3510/8000.

4.4.5 Field Quality Assurance/Quality Control (QA/QC)

The following subsections describe the quality assurance/quality control (QA/QC) procedures employed during RI field activities at the NVANG Base.

4.4.5.1 Field Procedure Documentation. Daily log books were kept documenting field activities and field GC operation. Ground water monitoring information was recorded on ground water monitoring forms, and well development information was recorded on well development forms. The ground water monitoring and well development forms were kept in a bound notebook.

4.4.5.2 Equipment Decontamination. Before use, all soil sampling equipment that would directly contact the samples was scrubbed with a solution of tap water and Alconox, and rinsed with tap water, pesticide grade methanol, and ASTM Type I water. The submersible pump used for purging the monitoring wells was decontaminated by pumping Alconox solution followed by tap water through the pump and tubing. The auger flights were decontaminated before each use by steam cleaning.

4.4.5.3 Field QA/QC Samples. Field duplicate samples and field and trip blanks were submitted to the analytical laboratory to provide the means to assess the quality of the data resulting from the field sampling program. Field blanks were collected at the frequency of one every two days, and trip blanks were collected at the frequency of one per cooler per day. Field and trip blank samples were analyzed to check for contamination associated with sampling procedures and/or ambient conditions at the site. Duplicate samples were collected at the frequency of 10 percent of the original number of samples. Equipment blanks were prepared at the frequency of one every two days to determine the adequacy of the equipment decontamination procedures. QA/QC samples were submitted using nonindicative sample identifiers to provide a QA check on analytical procedures and results.

Matrix spike samples provide information about the effect of the sample matrix on the analytical methodology. Matrix spike analyses were performed within the analytical laboratory. All matrix spikes were performed in duplicate. One matrix spike/matrix spike duplicate was designated for every 20 samples per sample matrix (ground water and soil).

QC for field measurements (pH and specific conductance) consisted of a premeasurement calibration and a postmeasurement verification using standard reference solutions, in accordance with the manufacturer's recommendations. These procedures were performed at least once per day.

Holding times for water and soil samples are summarized in Table 4-5. Holding times are defined as the maximum length of time that samples may be held before the completion of analytical protocols. All samples were chilled in a temperature range between 2° and 4°C and were maintained at that temperature through transport and subsequent storage at the analytical laboratory.

4.4.5.4 Ground Water Sample Preservation. Samples collected for VOC analysis were preserved with no more than two drops of a 1:1 solution of hydrochloric acid per 40-milliliter glass VOC vial. The vial had

TABLE 4-5

Summary of Holding Times for Water and Soil Samples
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Parameter	Holding Time
	Water Samples
Volatile Organic Compounds	Analyze within 14 days of collection.
Lead	Analyze within 6 months of collection.
Total Petroleum Hydrocarbons	Extract within 14 days of collection and analyze within 40 days of extraction.
Semivolatile Organic Compounds	Extract within 14 days of collection and analyze within 40 days of extraction.
	Soil Samples
Volatile Organic Compounds	Analyze within 14 days of collection.
Total Petroleum Hydrocarbons	Extract within 7 days of collection and analyze within 40 days of extraction.
Semivolatile Organic Compounds	Extract within 14 days of collection and analyze within 40 days of extraction.

Teflon-lined septa within the lid. Samples collected for TPH analysis were collected in 40-milliliter glass vials with Teflon septa. Samples collected for SVOC analysis were stored in a 1-liter amber glass bottle with a Teflon-lined lid. Samples collected for lead analysis were preserved in a 200-milliliter polyethylene container. All ground water samples were stored in ice chests with enough ice to maintain samples at a temperature less than 4°C.

4.4.5.5 Soil Sample Preservation. All soil samples submitted for laboratory analysis were contained in brass sleeves. Immediately upon removal from the split-spoon sampler, the ends of the filled brass sleeves were covered first with Teflon (a moisture barrier) and then with a fitted plastic cap. Samples were then placed in individual Gladlock bags and stored in an ice chest with enough ice to maintain samples at a temperature of less than 4° C.

4.5 Location and Elevation Survey

Locatic and elevation surveys at the NVANG were performed by Pyramid Engineers & Land Surveyors, Inc., of Reno, Nevada. The locations of RI wells and soil borings were tied into the state plane coordinate system using control points previously surveyed during the SI. The elevations of soil borings and monitoring wells were also tied into control points previously surveyed during the SI. Appendix D contains coordinates and elevations of soil borings and monitoring wells surveyed during the RI.

4.6 Investigation Derived Wastes

Wastes generated during the RI field investigation consisted of soil cuttings from drilling activities, well equipment decontamination water, development water, and solid wastes.

Drill cuttings from each well were segregated and contained in labeled, 55-gallon steel drums at the time of drilling. Well development waters were also segregated by well and contained in 55-gallon steel drums. The drums were moved from each IRP site to a centralized staging area at the Base. Recommendations regarding disposition of drill cuttings are provided in Appendix G.

Equipment decontamination water was contained in a 4,000-gallon polyethylene tank. At the completion of sampling activities, on May

26, 1995, water samples were collected from the tank using a disposable bailer. The samples were submitted for laboratory analysis and were analyzed for VOCs using EPA Method 8010/8020, TPH using EPA Method 8015 Modified (JP-4 and gasoline standards), and metals including cadmium, chromium, copper, lead, nickel, and zinc using EPA Method 6010. These analytical methods were chosen according to City of Reno guidelines and based on conversations with Mr. Dennis Dobyns, Environmental Control Section, City of Reno.

According to Mr. Dennis Dobyns, water contained in the tank had to meet drinking water standards to be acceptable for discharge into the sanitary sewer. Analytical results of tank water samples indicated that benzene was the only compound detected at a concentration above federal drinking water MCLs. No federal drinking water MCLs are available for TPH.

Water contained in the tank was resampled on June 20, 1995. The sample was analyzed for BTEX using EPA Method 8240, and TPH using EPA Method 8015 Modified (gasoline standard). TPH was not detected above detection limits, and BTEX were detected at concentrations lower than federal drinking water MCLs. Based on these results, the water contained in the tank was discharged to the sanitary sewers at the NVANG Base. Analytical results for both rounds of tank water sampling are included in Appendix G.

Well development and sample purge water was containerized in 55-gallon steel drums. Recommendations regarding disposition of this containerized water are provided in Appendix G.

Solid wastes generated during the RI field work (paper and plastic) were disposed of with regular Base trash.

SECTION 5.0

INVESTIGATION FINDINGS

The following section presents a summary of RI findings at the NVANG Base, including information regarding basewide geologic and hydrologic conditions, background soil and ground water quality, and site characterization findings for IRP Sites 4, 5, 7, and 14. This section also provides conclusions based on the findings for the four IRP sites investigated.

5.1 Basewide Geologic and Hydrogeologic Investigation Results

Review of data collected during both RI and SI drilling activities suggests that the near-surface geology consists of lacustrine silty clay underlain by alluvial sand and gravel. A fence diagram for the entire base was prepared by ORNL/ETS as part of the SI (Figure 5-1). The fence diagram illustrates some of the relationships between the surface silty clay and underlying alluvium. On the western side of the Base, the surface silty clay is underlain by a fine-grained sand unit containing varying amounts of site. This fine-grained sand unit progressive thins and becomes coarser grained from west to east. The fine-grained sand is underlain by a well-graded gravelly sand with varying amounts of gravel and cobbles. The top of the gravelly sand unit is typically encountered at depths ranging from 5 to 10 feet below ground surface (bgs) and is the most hydrologically significant unit at the Base, based on aquifer testing, as discussed below.

Ground water occurs in the course grained alluvium (sand and gravelly sand) at the Base. The surface silty clay layer acts as a confining unit for the underlying coarse grained alluvium in areas at the NVANG Base where the elevation of the piezometric surface in the coarse grained alluvium is above the base of the surface silty clay layer. In these areas, ground water is initially encountered immediately below the bottom of the surface silty clay layer. After this layer is penetrated by a borehole or well, water levels rise to elevations above the bottom of the confining unit.

Water level measurements were measured during both SI and RI activities for the purpose of preparing potentiometric maps for the Base. Figures 5-2 through 5-4 are potentiometric maps for the Base and

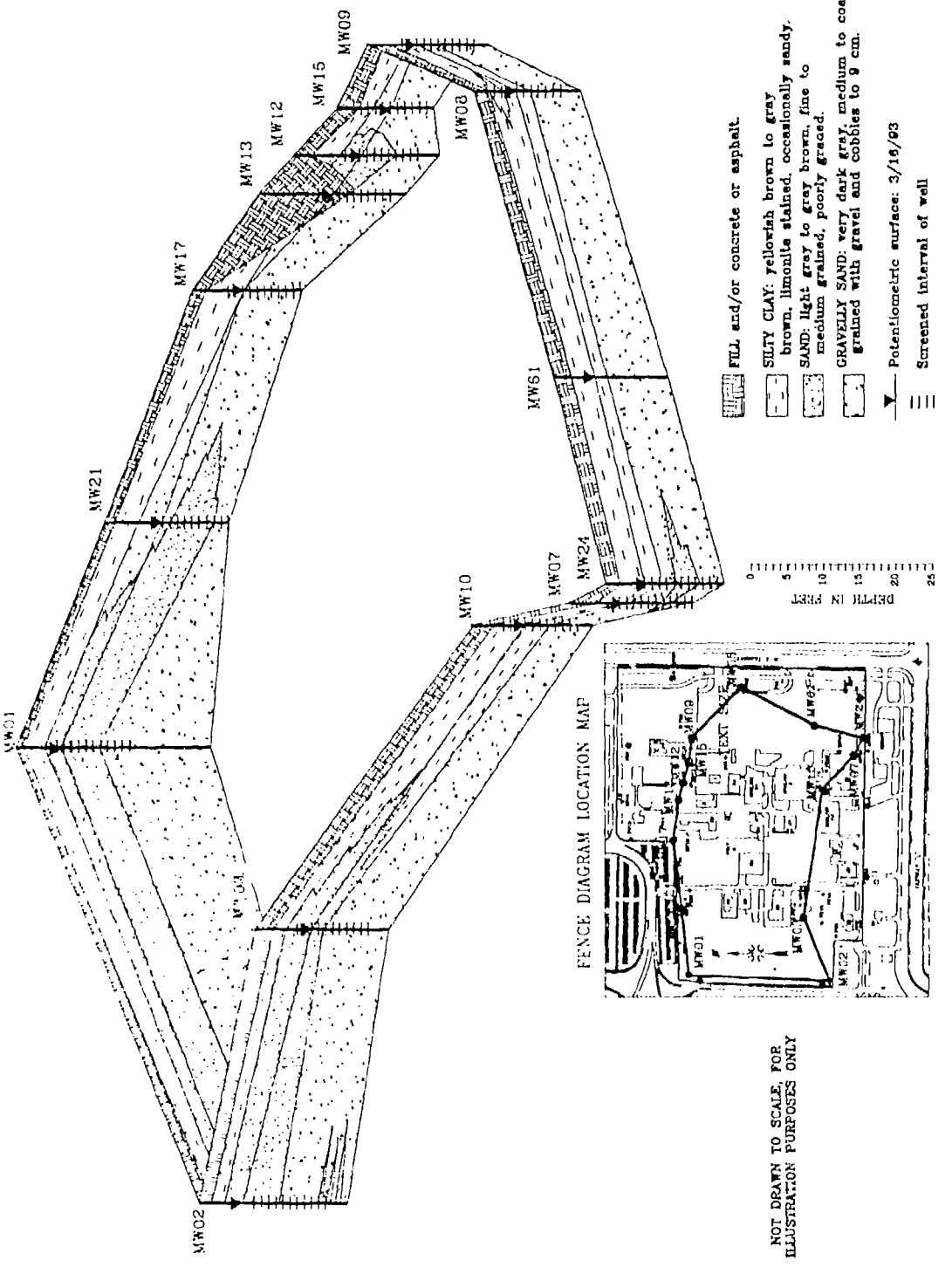
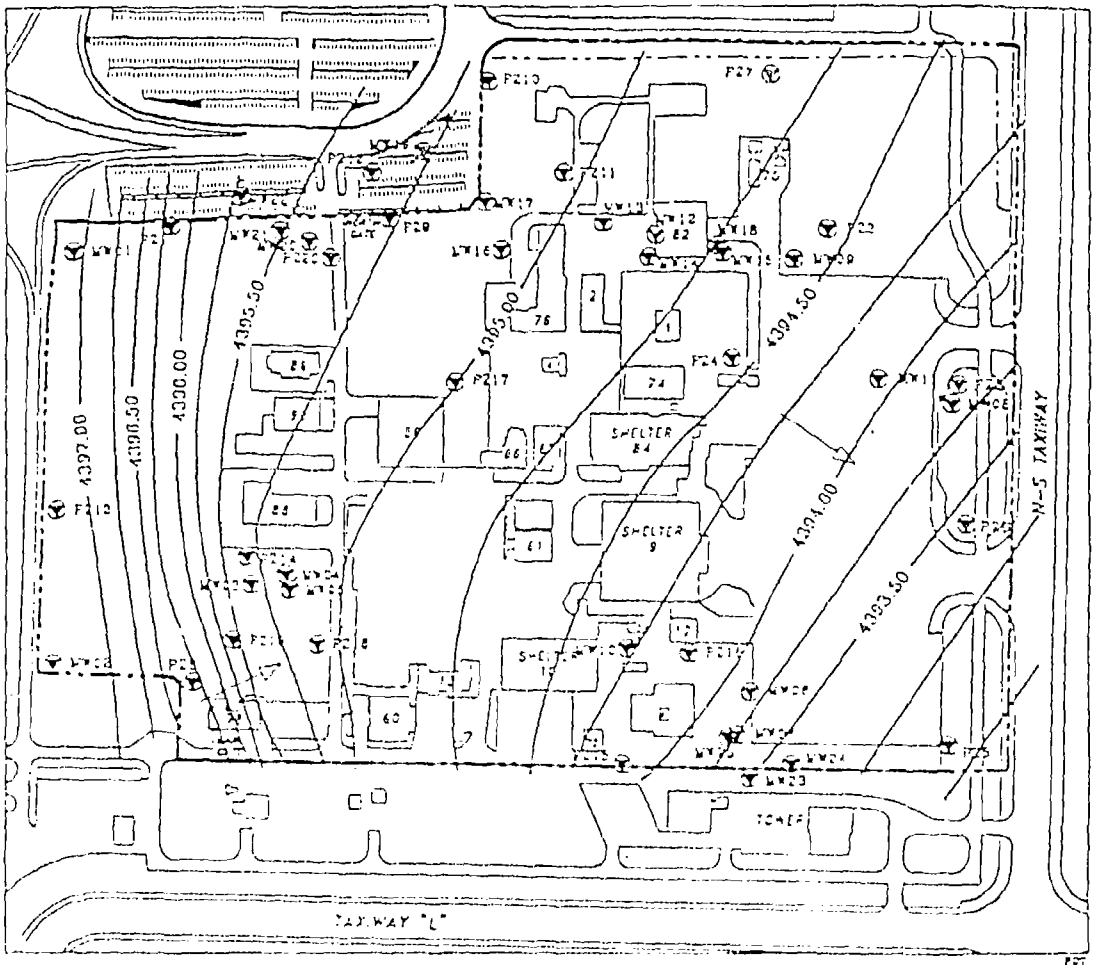


FIGURE 5-1

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FENCE DIAGRAM
OF THE BASE
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM



—4394.00— FEET ABOVE MEAN SEA LEVEL

—·— BASE BOUNDARY

PIEZOMET /MONITORING WELL LOCATION

CONTOUR INTERVAL .05 ft

WATER-LEVEL MEASUREMENTS TAKEN 12/4/92

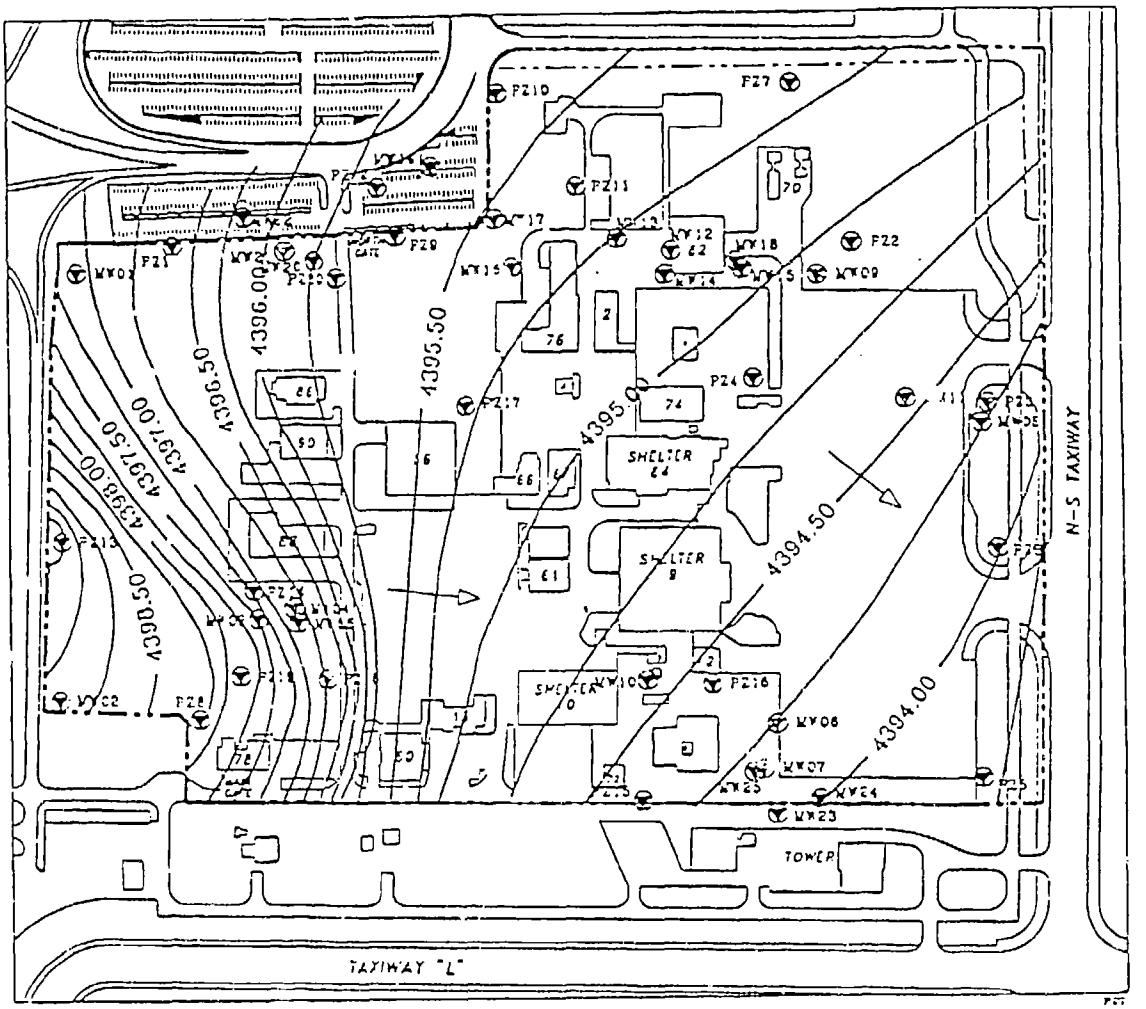
SOURCE: ORNL/EIS, 1994

FIGURE 5-2

F:\HOME\SHARON\RENO\NEWRENO\FIG5-2TB.DWG

POTENTIOMETRIC SURFACE
DECEMBER 1992
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM



—4394.00— FEET ABOVE MEAN SEA LEVEL

—·— BASE BOUNDARY

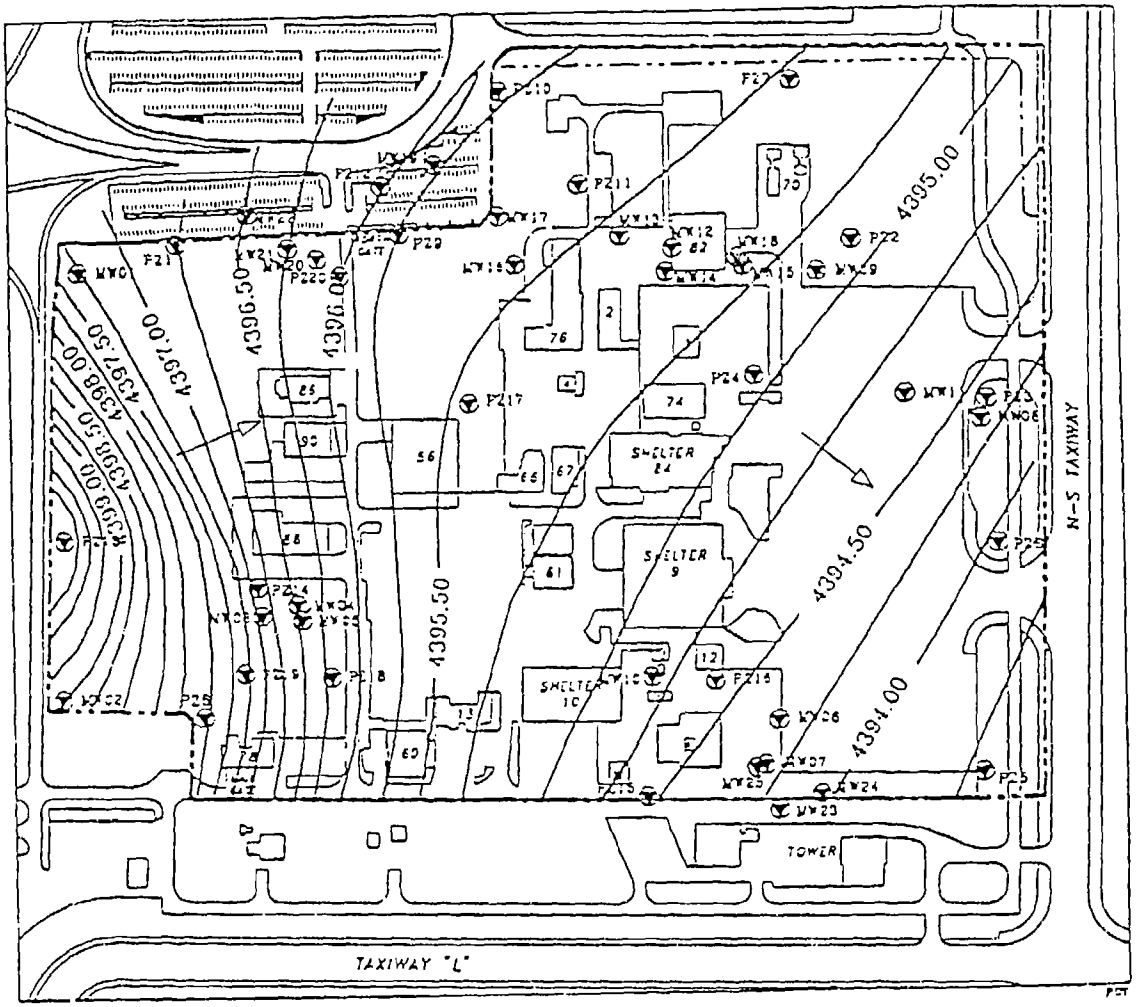
PIEZOMETER/MONITORING WELL LOCATION

CONTOUR INTERVAL: .25 ft

WATER-LEVEL MEASUREMENTS TAKEN 2/3/93

SOURCE: ORNL/ETS, 1994

FIGURE 5-3 F:\HOME\SHARON\RENO\NEWRENO\FG5-3TB.DWG	POTENTIOMETRIC SURFACE FEBRUARY 1993 152nd TACTICAL RECONNAISSANCE GROUP NVANG, RENO, NEVADA	ERM



—4394.00— FEET ABOVE MEAN SEA LEVEL

—·— BASE BOUNDARY

⊕ PIEZOMETER/MONITORING WELL LOCATION

CONTOUR INTERVAL: .25 ft

WATER-LEVEL MEASUREMENTS TAKEN 3/16/93

SOURCE: ORNL/ETS, 1994

FIGURE 5-4

F:\HOME\SHARON\RENO\NEWRENO\FG5-4TB.DWG

POTENTIOMETRIC SURFACE
MARCH 1993
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

were constructed based on data collected during SI activities for the months of December 1992, February 1993, and March 1993. Figures 5-5, 5-6, and 5-6A present potentiometric maps based on data collected during RI activities in May 1995, August 1995, and November 1995. It is apparent that the RI potentiometric maps are less detailed than those constructed based on SI data. The reason for this difference in detail is that all of the piezometers constructed during the SI had been abandoned prior to the start of RI field work. Additionally, several SI monitoring wells had been either destroyed and/or covered up by various construction activities at the Base. Table 4-3 presents a summary of the remaining monitoring wells at the Base.

Despite the difference in degree of detail, all of the potentiometric maps presented illustrate the general east-southeast direction of ground water flow at the Base. Additionally, it appears that only minor variation (i.e., generally less than 2 feet) has occurred in water levels measured at individual monitoring wells during the period December 1992 through November 1995.

Hydraulic testing was performed by ORNL/ETS as part of the SI for the Base to determine the overall hydraulic properties of the aquifer. Figure 5-7 shows the monitoring wells at which aquifer testing was conducted. Estimated transmissivity values of the shallow aquifer at the Base range from 39 to 3,110 feet squared per day, as summarized on Table 5-1.

Ground water monitoring has been performed at three monitoring wells located adjacent to IRP Site 12 - Aircraft Parking Apron Area (monitoring wells MW08, MW26, and MW27). IRP Site 12 - Aircraft Parking Apron Area was previously investigated by OpTech, as detailed in Section 2.2.2 of this report. Table 5-2 summarizes the monitoring results of these monitoring wells, including data collected during RI monitoring activities. The most significant finding is the historic detection of TCE, and its byproducts cis-1,2-dichloroethylene (cis-1,2-DCE) and trans-1,2-dichloroethylene (trans-1,2-DCE) in ground water samples collected from monitoring well MW08. TCE has occasionally been detected in monitoring well MW08 ground water samples at concentrations ranging from 1 to 27 µg/l. The current MCL for TCE is 5 µg/l. Other VOCs have also been detected in Site 12 - Aircraft Parking Apron Area ground water samples: 1,1-dichloroethane, 1,1,1-trichloroethane, and 2-butanone. Neither these other VOCs nor cis- and trans-1,2-DCE have been detected at concentrations exceeding their respective MCLs.

TABLE 5-1

Results of SI Aquifer Testing
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Test Location Identifier	IRP Site	Screened Aquifer Thickness, Feet	Transmissivity, Feet Squared Per Day	Hydraulic Conductivity, Feet Per Day	Hydraulic Conductivity, Centimeters Per Second	Estimated Gradient	Estimated Average Linear Velocity, Feet Per Year
MW20	Site 3	6.5	3,110	479	1.69E-01	2.86E-03	2,000
MW21	Site 3	6.5	1,816	279	9.84E-02	2.86E-03	1,160
MW02	Site 4	9.8	39	4	1.41E-03	3.28E-03	19
MW03	Site 4	9.0	61	7	2.36E-03	3.17E-03	32
MW23	Site 7	6.5	250	38	1.34E-02	5.26E-03	290
MW08	Site 12	7.0	1,628	232	8.18E-02	2.13E-03	720
PZ02	Site 12	7.0	2,774	396	1.40E-01	2.13E-03	1,230

Source of Hydraulic Parameters: ORNL/ETS, 1994 . In performing this analysis ORNL/ETS considered only the permeable portions of the aquifer adjacent to the well screen.

Assume effective porosiity of 25 percent for velocity computation.

TABLE 5-2

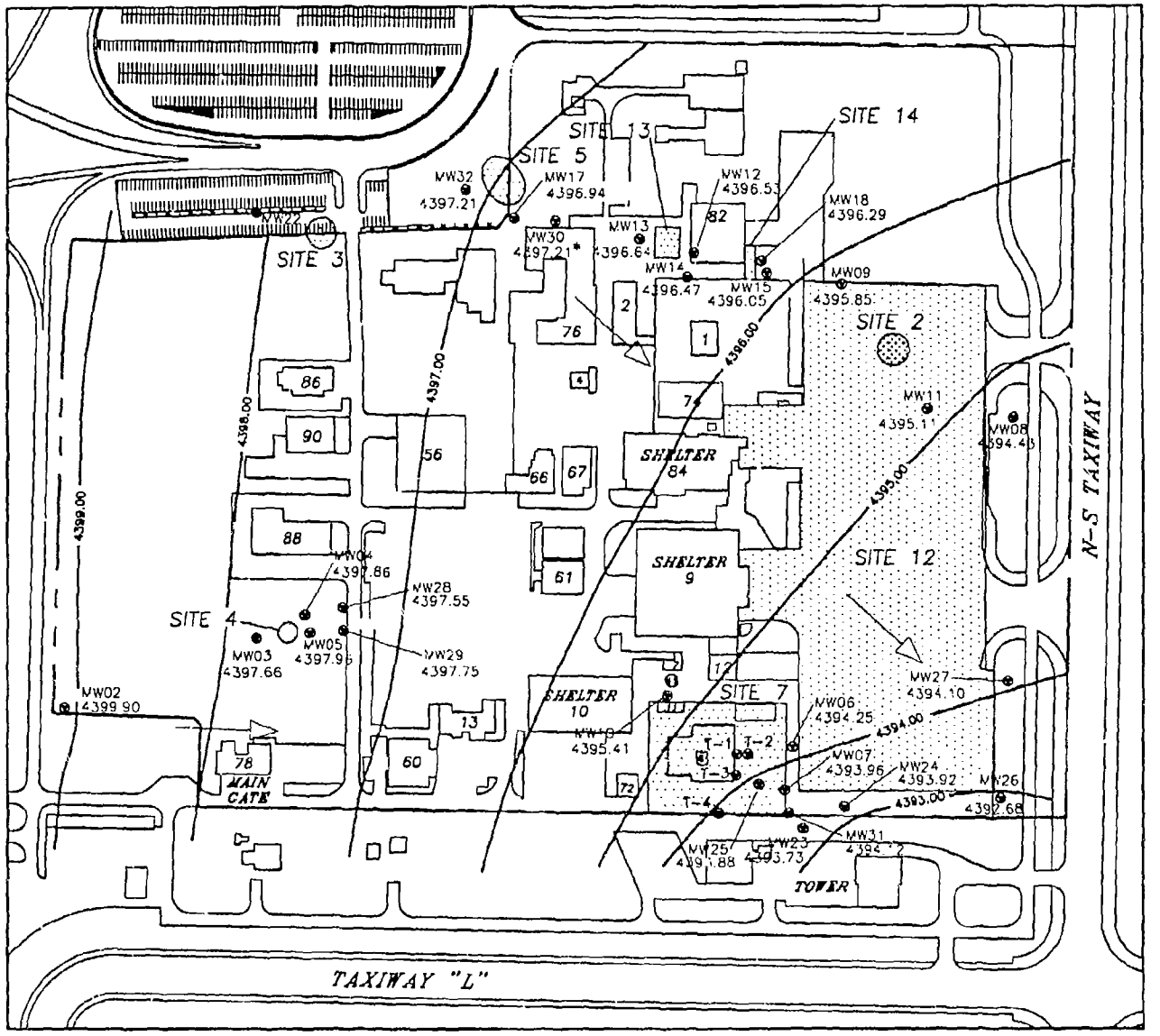
Organic Compounds Detected in Site 12 - Aircraft Parking Apron Area Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Compound	Monitoring Well MW08										Monitoring Well MW26								Monitoring Well MW27							
	12/92	3/93	11/93	4/94	7/94	9/94	1/95	5/95	8/95	11/95	11/93	4/94	7/94	9/94	1/95	5/95	8/95	11/95	11/93	4/94	7/94	9/94	1/95	5/95	8/95	11/95
VOC concentration in micrograms per liter																										
Trichloroethylene	6.0	2.0 J				2 J	27	5	1	1																
1,1-Dichloroethane												1 J	3 J					1.2								
1,2-Dichloroethylene (Total)		18																								
Cis-1,2-Dichloroethylene				9 J	9 J	42																				
Trans-1,2-Dichloroethylene						2 J	19	10	2.8	3.9																
1,1,1-Trichloroethane												3 J	5 J													
2-Butanone																				2 J						
TPH concentration in milligrams per liter																										
TPH		0.05 J	2.9	NS							2.6	NS							4.1	NS						

VOC = volatile organic compound

TPH = total petroleum hydrocarbons

NS = not sampled



EXPLANATION

- ORIGINAL IRP SITE
- BASE BOUNDARY
- MW02 — MONITORING WELL LOCATION
- 4393.00 — ELEVATION OF POTENTIOMETRIC SURFACE IN FEET ABOVE MEAN SEA LEVEL
- GROUND WATER FLOW DIRECTION

0 150 300

FEET

* PROBABLE ERROR IN MEASUREMENT

FIGURE 5-5

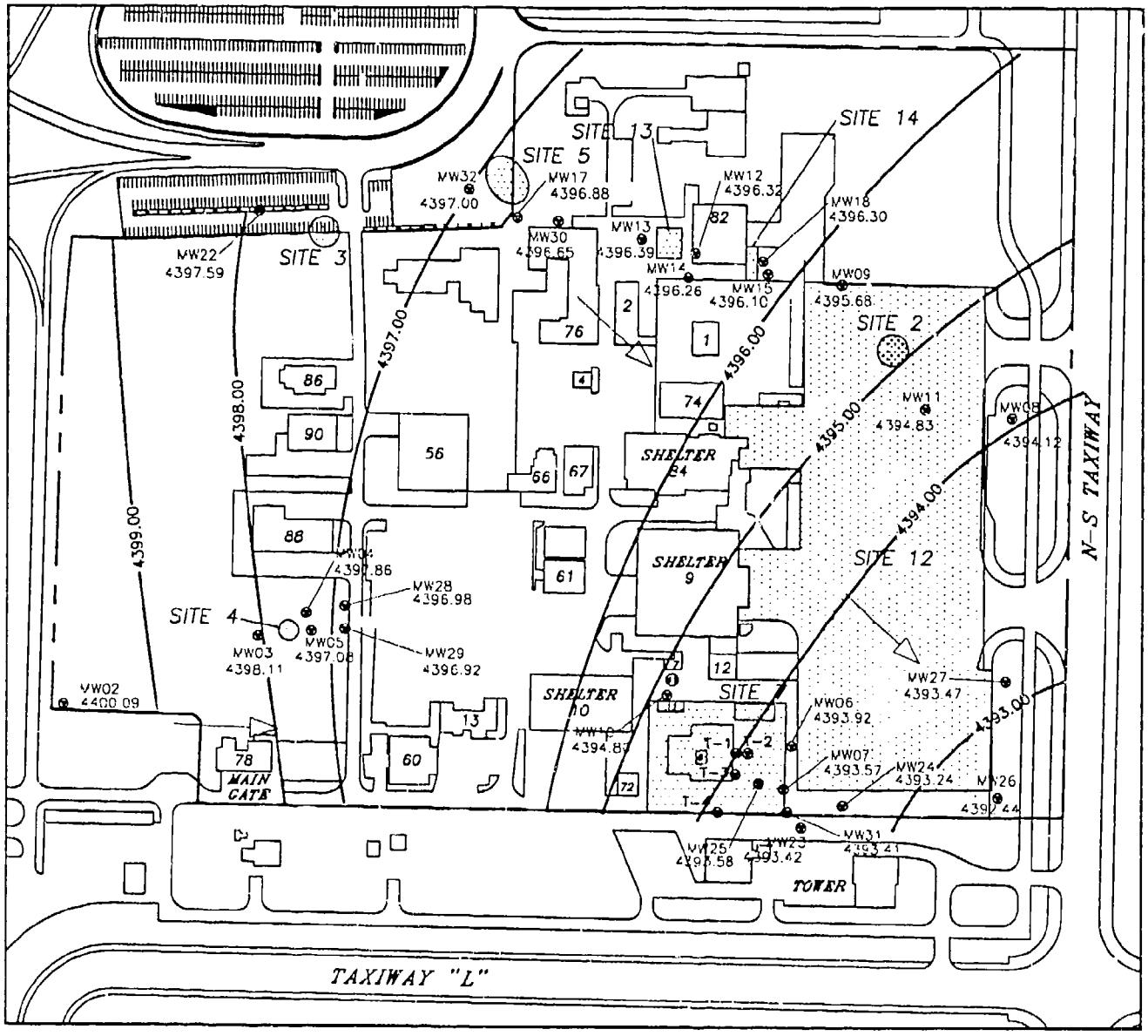
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POTENTIOMETRIC SURFACE, MAY 1995

152nd TACTICAL RECONNAISSANCE GROUP

NVANG, RENO, NEVADA

ERM



EXPLANATION

- ORIGINAL IRP SITE
- BASE BOUNDARY
- MW02 — MONITORING WELL LOCATION
- 4393.00 — ELEVATION OF POTENTIOMETRIC SURFACE IN FEET ABOVE MEAN SEA LEVEL
- GROUND WATER FLOW DIRECTION

0 150 300

FEET

* PROBABLE ERROR IN MEASUREMENT

FIGURE 5-6

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POTENTIOMETRIC SURFACE, AUGUST 1995

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

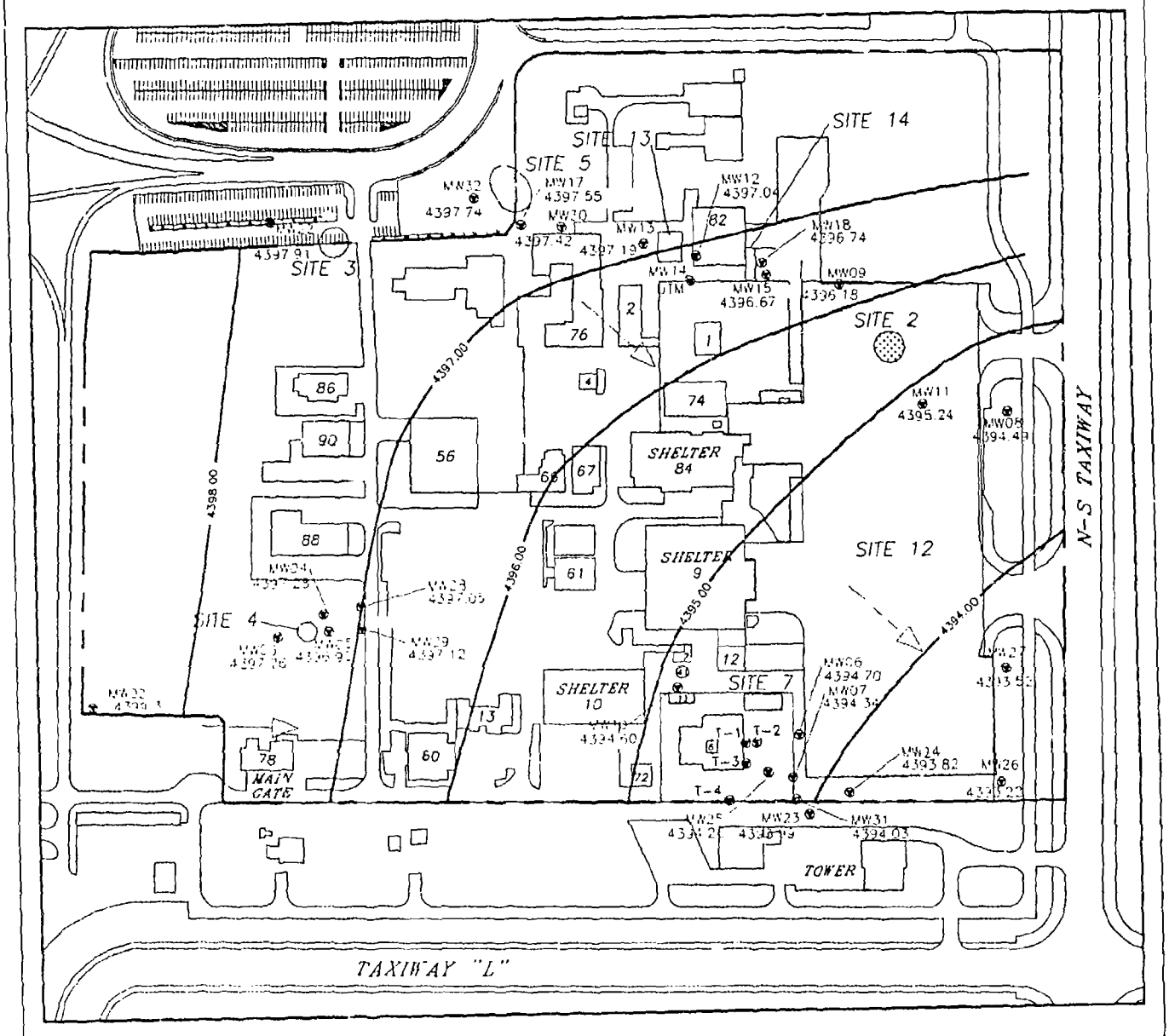


FIGURE 5-6A

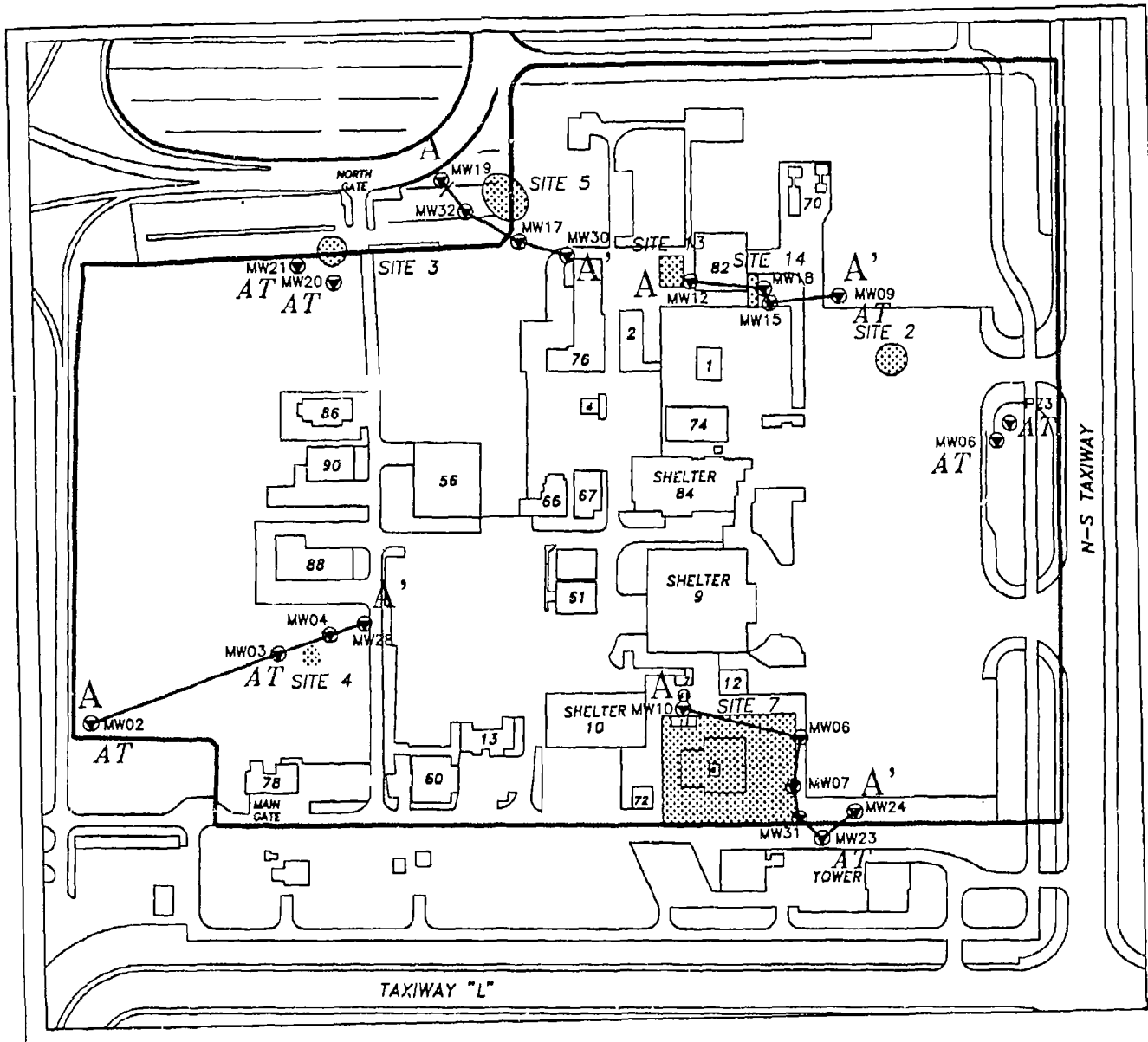
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POTENTIOMETRIC SURFACE, NOVEMBER 1995

152nd TACTICAL RECONNAISSANCE GROUP

NVANG, RENO, NEVADA

ERM



IRP Site

Base Boundary

MW03 Abandoned Piezometer/Monitoring Well Location

A — A' Cross Section Line

AT Aquifer Testing Locations

FEET
0 75 150 300
0 15 30 60 90
METERS

N.

FIGURE 5-7

F:\HOME\SHARON\RENO\NEWRENO\REO39.DWG

AQUIFER TESTING LOCATIONS AND LOCATIONS OF CROSS SECTIONS

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

5.2 Background Sampling Results

The ORNL/ETS SI included collection of background soil and ground water samples. The following sections summarize the results of ORNL/ETS's background investigation.

5.2.1 Background Soil Investigation Results

ORNL/ETS drilled and sampled two background soil borings during SI investigation activities. The borings were subsequently completed as monitoring wells MW01 and MW02 (Figure 5-5). The background soil boring sites were placed in areas reported to have had no waste management activities and in areas upgradient of the IRP sites under investigation.

Four soil samples were collected for chemical analysis from the boring located at monitoring well site MW01 at depths of 2, 4, 6, and 8 feet bgs. Three soil samples were collected for chemical analysis from the boring located at monitoring well site MW02 at depths of 4, 6, and 8 feet bgs. The soil samples analyzed for both VOCs and SVOCs.

Three VOCs were detected in background soil samples: chloroform (2 µg/kg), methylene chloride (200 µg/kg), and acetone (4,400 µg/kg). Two SVOCs were detected in background soil samples: bis(2-ethylhexyl)phthalate (44 to 69 µg/kg) and 4-nitrophenol (43 µg/kg).

5.2.2 Background Ground Water Investigation Results

ORNL/ETS collected background ground water samples from monitoring wells MW01 and MW02 during two sampling rounds during SI investigation activities. Three VOCs were detected in background ground water samples: chloroform (2 µg/l), toluene (1 µg/l), and carbon disulfide (9 µg/l). Three SVOCs were detected in background ground water samples: di-n-butyl phthalate (1 to 2 µg/l), butylbenzyl phthalate (1 µg/l), and diethyl phthalate (1 µg/l).

5.3 Site 4 - Former FTA

The following is a description of RI activities at IRP Site 4 - Former FTA, including geologic and hydrologic investigation results, screening results, soil and ground water investigation results, and conclusions.

5.3.1 Geologic and Hydrologic Investigation Results

The subsurface lithologies encountered at Site 4 - Former FTA are fill material, yellowish-brown to gray silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained, poorly graded sand, and very dark gray, well-graded sandy gravel with occasional cobbles. The geologic cross section presented in Figure 5-8 was constructed using lithologic data from monitoring wells MW02, MW03, MW04, and MW28.

Approximately 2 feet of fill material are present across the entire site. The underlying silty clay is approximately 2 feet thick across most of the site but thickens to 5 feet in monitoring well MW04 on the eastern edge. The underlying poorly graded sand averages about 4 feet in thickness at Site 4 - Former FTA and gradually thickens to the southwest. Thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 4 - Former FTA monitoring wells were evaluated and the ground water flow direction was determined to be to the east during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A.

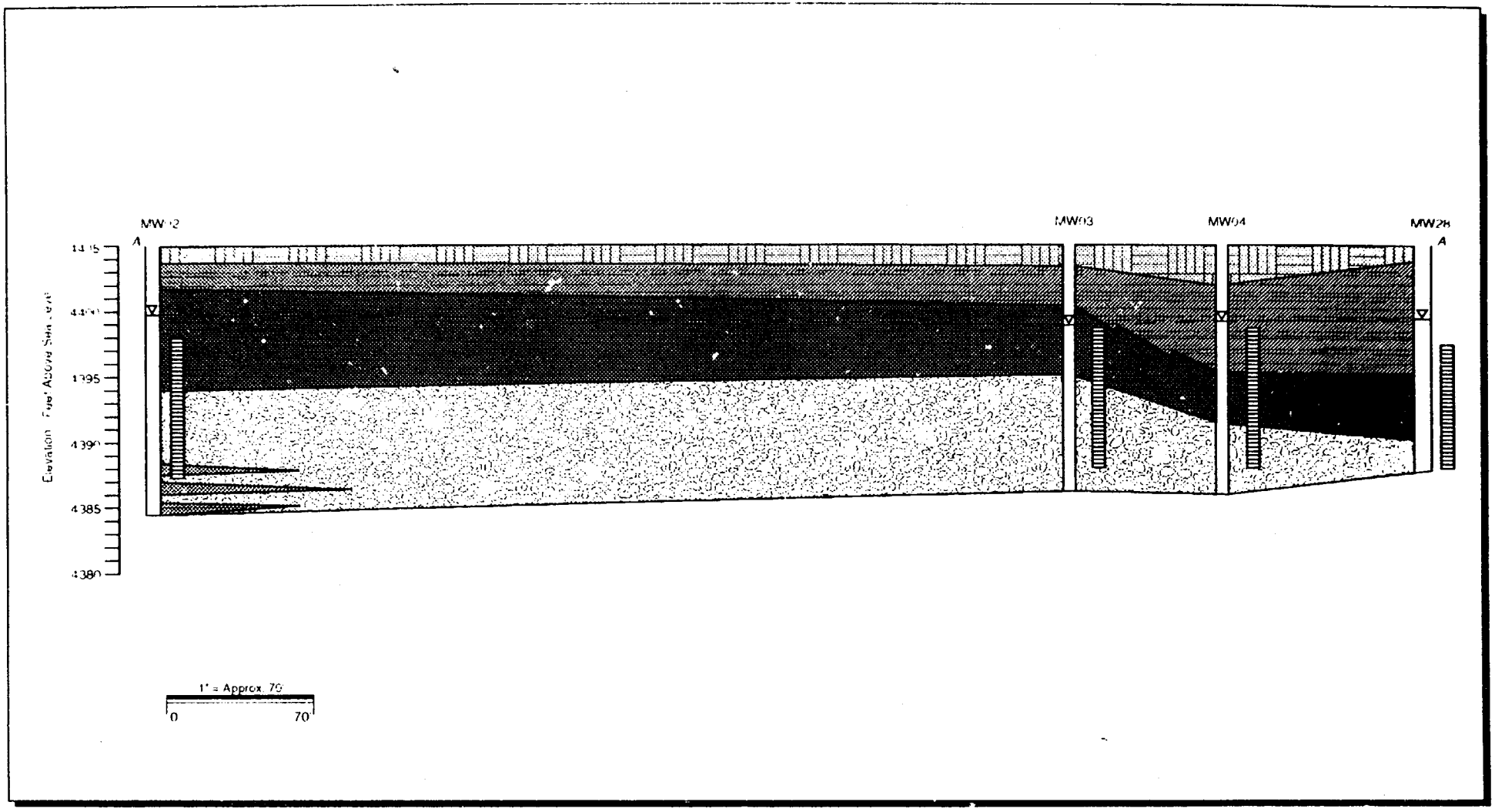
Confined aquifer conditions were encountered during drilling of the RI soil borings and monitoring wells at this site. The surficial silty clay layer serves as the confining unit for the underlying sand/gravelly sand aquifer. Figure 5-8 illustrates that water level elevations measured in monitoring wells MW04 and MW28 are approximately 4 feet above the base of the confining unit.

5.3.2 Screening Results

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.3.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB4-1 through SB4-7,



LEGEND

- Fill
- Silty Clay
- Sand
- Gravelly Sand
- Screened Interval of Well
- Water Level Taken 5/95

LOCATION MAP

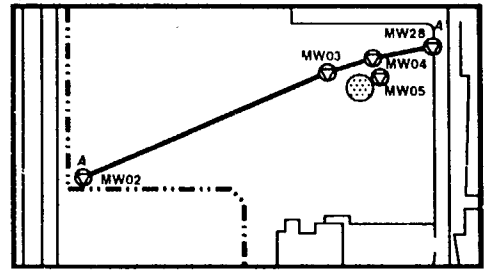


Figure 5-8
IRP Site 4-Former FTA
Geological Cross Section
152nd Tactical Reconnaissance Group, NVANG Base
Reno, Nevada

ERM-West, Inc. 7/95
6001.41.WDK/08.01.95

located at Site 4 - Former FTA. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-3 summarizes the soil sampling program for chemical analysis.

Chain-of-Custody Records are included in Appendix E. Complete analytical results for soil samples collected from soil borings drilled at Site 4 - Former FTA are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory analysis are presented in Tables 5-4 through 5-6. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB4-4-5.5 denotes the soil sample collected at soil boring SB4-4 at a depth of 5.5 to 6.0 feet bgs.

5.3.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB4-2 and SB4-4 through SB4-7: acetone (24 to 1,910 µg/kg), benzene (79 µg/kg), 2-butanone (475 to 1,160 µg/kg), chlorobenzene (245 to 2,350 µg/kg), ethylbenzene (58 to 3,400 µg/kg), toluene (120 µg/kg), and xylenes (976 to 12,000 µg/kg). In general, the highest VOC concentrations in Site 4 - Former FTA soil samples were detected in sample SB4-5-7.5 (Table 5-4 and Figure 5-9).

5.3.3.2 Semivolatile Organic Compounds. SVOCs were detected only in soil samples collected from soil boring SB4-5. The following SVOCs were detected in one or more soil samples collected from this soil boring: 1,2,4-trichlorobenzene (2,640 to 10,500 µg/kg), 1,2-dichlorobenzene (2,940 to 22,500 µg/kg), 1,3-dichlorobenzene (1,170 to 8,320 µg/kg), 1,4-dichlorobenzene (1,220 to 8,960 µg/kg), 2,4-dichlorophenol (240 µg/kg), 2-methylnaphthalene (634 to 728 µg/kg), and 4-methylphenol (659 to 714 µg/kg). In general, the highest SVOC concentrations in Site 4 - Former FTA soil samples were detected in soil sample SB4-5-7.5 (Table 5-5 and Figure 5-9).

5.3.3.3 Total Petroleum Hydrocarbons. TPH were detected at concentrations ranging from 3.42 to 1,400 milligrams per kilogram (mg/kg) in soil samples collected from soil borings SB4-3, SB4-5, and SB4-6. The highest TPH concentration in Site 4 - Former FTA soil samples was detected in soil sample SB4-5-7.5 (Table 5-6 and Figure 5-10).

5.3.4 Ground Water Investigation Results

Ground water samples were collected from Site 4 - Former FTA in May 1995 from monitoring wells MW03, MW04, MW05, MW28, and MW29. Monitoring wells MW04, MW05, MW28, and MW29 were resampled in July 1995 for VOC analysis due to quality control

TABLE 5-3

Summary of Site 4 - Former FTA Soil and Ground Water Sample Collection Activities
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
Soil	SB4-1	5/16/95	1.5, 3.5, 5.5, 9.5
	SB4-2	5/17/95	2, 3.5, 5.5, 7.5
	SB4-3	5/17/95	1.5, 3.5, 5.5
	SB4-4	5/16/95	1.5, 3.5, 5.5, 7.5, 9
	SB4-5	5/16/95	1.5, 3.5, 5.5, 7.5, 9
	SB4-6	5/16/95	1.5, 5.5, 7.5, 10, 11.5
	SB4-7	5/17/95	1.5, 3.5, 5.5, 7.5
Ground Water	MW03	5/14/95 8/23/95 11/16/95	NA
	MW04	5/25/95 7/12/95** 8/23/95 11/15/95	NA
	MW05	5/24/95 7/13/95** 8/24/95 11/16/95	NA
	MW28	5/24/95 7/12/95** 8/23/95 11/15/95	NA
	MW29	5/24/95 7/12/95** 8/23/95 11/15/95	NA

* = Sample depth listed is at the top of a 6-inch sample interval
** = Resampling date
NA = not applicable

TABLE 5-4

Volatile Organic Compounds Detected in Site 4 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram												
Location Identifier	Date Sampled	Laboratory Number	Acetone	Chlorobenzene	Chloroform	Methylene Chloride	2-Hexanone	2-Butanone	4-Methyl-2-pentanone	PCE	TCE	Benzene	Ethylbenzene	Toluene	Xylenes (total)
SB4-1-3.5	5/16/95	88262	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-5.5	5/16/95	88263	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-9.5	5/16/95	88264	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-9.5*	5/16/95	88265	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-2-2.0	5/17/95	88281	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-2-5.5	5/17/95	88282	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-2-7.5	5/17/95	88283	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-3-1.5	5/17/95	88278	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-3-3.5	5/17/95	88279	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-3-5.5	5/17/95	88280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-5.5	5/16/95	88272	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-7.5	5/16/95	88273	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-9.0	5/16/95	88274	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-9.0*	5/16/95	88275	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-5-5.5	5/16/95	88269	1,910	356	ND	ND	ND	1160	ND	ND	ND	ND	311	ND	2,670
SB4-5-7.5	5/16/95	88270	1,750	2,350	ND	ND	ND	827	ND	ND	ND	79	3,400	120	12,000
SB4-5-9.0	5/16/95	88271	979	245	ND	ND	ND	475	ND	ND	ND	ND	374	ND	976
SB4-6-5.5	5/16/95	88266	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-6-10.0	5/16/95	88267	201	ND	ND	ND	ND	ND	ND	ND	ND	ND	58	ND	ND
SB4-6-11.5	5/16/95	88268	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-7-3.5	5/17/95	88288	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-7-5.5	5/17/95	88285	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB-4-7-7.5	5/17/95	88286	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	350,000	100,000	6,000	500	17,500	200,000	280,000	500	500	500	70,000	100,000	1,000,000

* = duplicate
PCE = tetrachloroethylene
TCE = trichloroethylene
ND = not detected

TABLE 5-5

Semivolatile Organic Compounds Detected in Site 4 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram													
Location Identifier	Date Sampled	Laboratory Number	Acenaphthene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Carbazole	Chrysene	Dibenzofuran	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2,4-Dichloro-phenol
SB4-1-3.5	5/16/95	88262	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-5.5	5/16/95	88263	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-9.5	5/16/95	88264	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-9.5*	5/16/95	88265	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-2-2.0	5/17/95	88281	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-2-5.5	5/17/95	88282	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-2-7.5	5/17/95	88283	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-3-1.5	5/17/95	88278	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-3-3.5	5/17/95	88279	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-3-5.5	5/17/95	88280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-5.5	5/16/95	88272	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-7.5	5/16/95	88273	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-9.0	5/16/95	88274	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-9.0*	5/16/95	88275	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-5-5.5	5/16/95	88269	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,440	3,650	ND
SB4-5-7.5	5/16/95	88270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	22,500	8,320	8,960	240
SB4-5-9.0	5/16/95	88271	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,940	1,170	1,220	ND
SB4-6-5.5	5/16/95	88266	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-6-10.0	5/16/95	88267	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-6-11.5	5/16/95	88268	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-7-3.5	5/17/95	88288	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-7-5.5	5/17/95	88285	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-7-7.5	5/17/95	88286	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	210,000	1,050,000	200	200	200	140,000	200	180	480	14,000	60,000	60,000	7,500	11,000

TABLE 5-5

Semivolatile Organic Compounds Detected in Site 4 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram										
Location Identifier	Date Sampled	Laboratory Number	Dibenzo (a,h) anthracene	Fluorene	Fluoranthene	Indeno (1,2,3-cd) pyrene	2-Methyl naphthalene	4-Methylphenol	Naphthalene	Phenanthrene	Pyrene	1,2,4-Trichloro-benzene	bis(2-Ethylhexyl) phathalate
SB4-1-3.5	5/16/95	88262	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-5.5	5/16/95	88263	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-9.5	5/16/95	88264	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-1-9.5*	5/16/95	88265	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-2-2.0	5/17/95	88281	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-2-5.5	5/17/95	88282	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-2-7.5	5/17/95	88283	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-3-1.5	5/17/95	88278	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-3-3.5	5/17/95	88279	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-3-5.5	5/17/95	88280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-5.5	5/16/95	88272	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-7.5	5/16/95	88273	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-9.0	5/16/95	88274	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-4-9.0*	5/16/95	88275	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-5-5.5	5/16/95	88269	ND	ND	ND	ND	634	714	ND	ND	ND	6,410	ND
SB4-5-7.5	5/16/95	88270	ND	ND	ND	ND	728	659	ND	ND	ND	10,500	ND
SB4-5-9.0	5/16/95	88271	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,640	ND
SB4-6-5.5	5/16/95	88266	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-6-10.0	5/16/95	88267	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-6-11.5	5/16/95	88268	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-7-3.5	5/17/95	88288	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-7-5.5	5/17/95	88285	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB4-7-7.5	5/17/95	88286	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	200	140,000	140,000	200	140,000	200,000	140,000	140,000	110,000	7,000	600

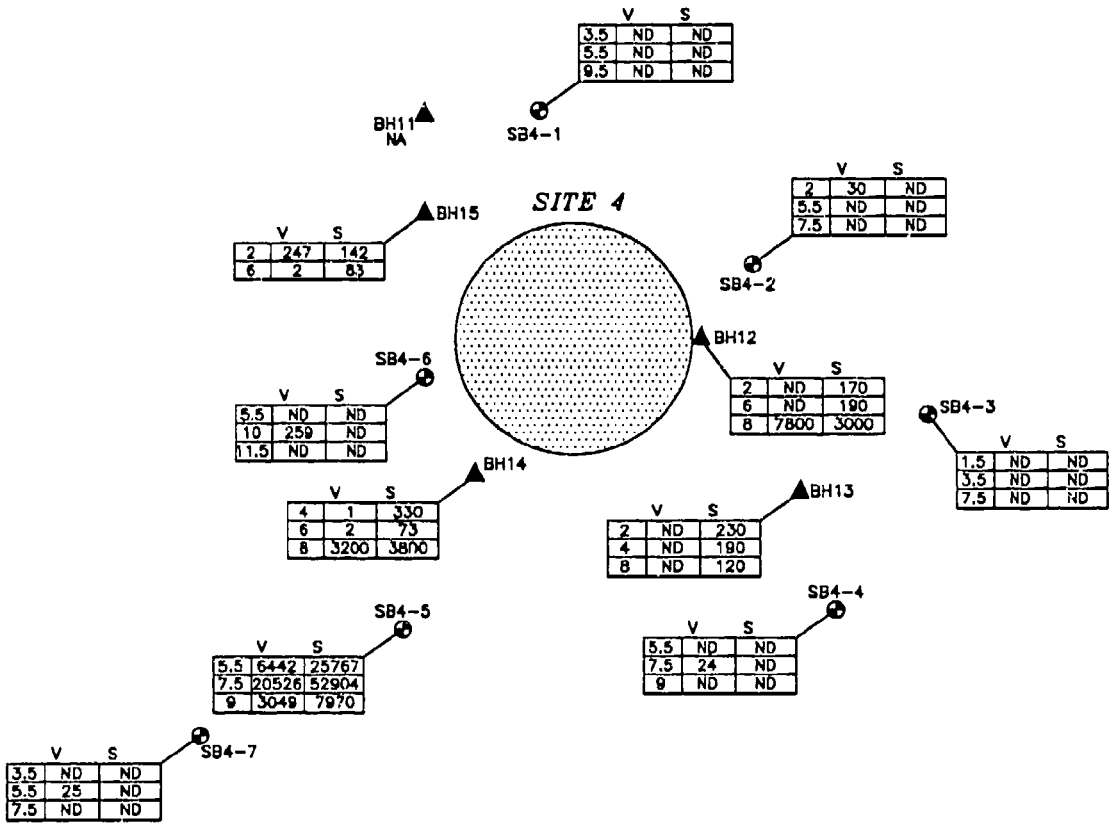
* = duplicate
ND = not detected

TABLE 5-6

Total Petroleum Hydrocarbons Detected in Site 4 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB4-1-3.5	05/16/95	88262	ND
SB4-1-5.5	05/16/95	88263	ND
SB4-1-9.5	05/16,'95	88264	ND
SB4-1-9.5*	05/16/95	88265	ND
SB4-2-2.0	05/17/95	88281	ND
SB4-2-5.5	05/17/95	88282	ND
SB4-2-7.5	05/17/95	88283	ND
SB4-3-1.5	05/17/95	88278	ND
SB4-3-3.5	05/17/95	88279	ND
SB4-3-5.5	05/17/95	88280	3.42
SB4-4-5.5	05/16/95	88272	ND
SB4-4-7.5	05/16/95	88273	ND
SB4-4-9.0	05/16/95	88274	ND
SB4-4-9.0*	05/16/95	88275	ND
SB4-5-5.5	05/16/95	88269	324
SB4-5-7.5	05/16/95	88270	1400
SB4-5-9.0	05/16/95	88271	178
SB4-6-5.5	05/16/95	88266	ND
SB4-6-10.0	05/16/95	88267	192
SB4-6-11.5	05/16/95	88268	ND
SB4-7-3.5	05/17/95	88288	ND
SB4-7-5.5	05/17/95	88285	ND
SB4-7-7.5	05/17/95	88286	ND
		Cleanup Level	210

* = duplicate
mg/kg = milligrams per kilograms
TPH = total petroleum hydrocarbons
ND = not detected



EXPLANATION

SEMIVOLATILE ORGANIC COMPOUNDS

VOLATILE ORGANIC COMPOUNDS

DEPTH, FEET BELOW GROUND LEVEL

	V	S
5.5	ND	ND
10	259	ND
11.5	ND	ND

TOTAL CONCENTRATION IN MICROGRAMS PER KILOGRAM

ND NOT DETECTED

NA NOT SAMPLED

ORIGINAL IRP SITE

SB4-4 SOIL BORING – REMEDIAL INVESTIGATION

BH13 SOIL BORING – SITE INVESTIGATION

N

0 15 30

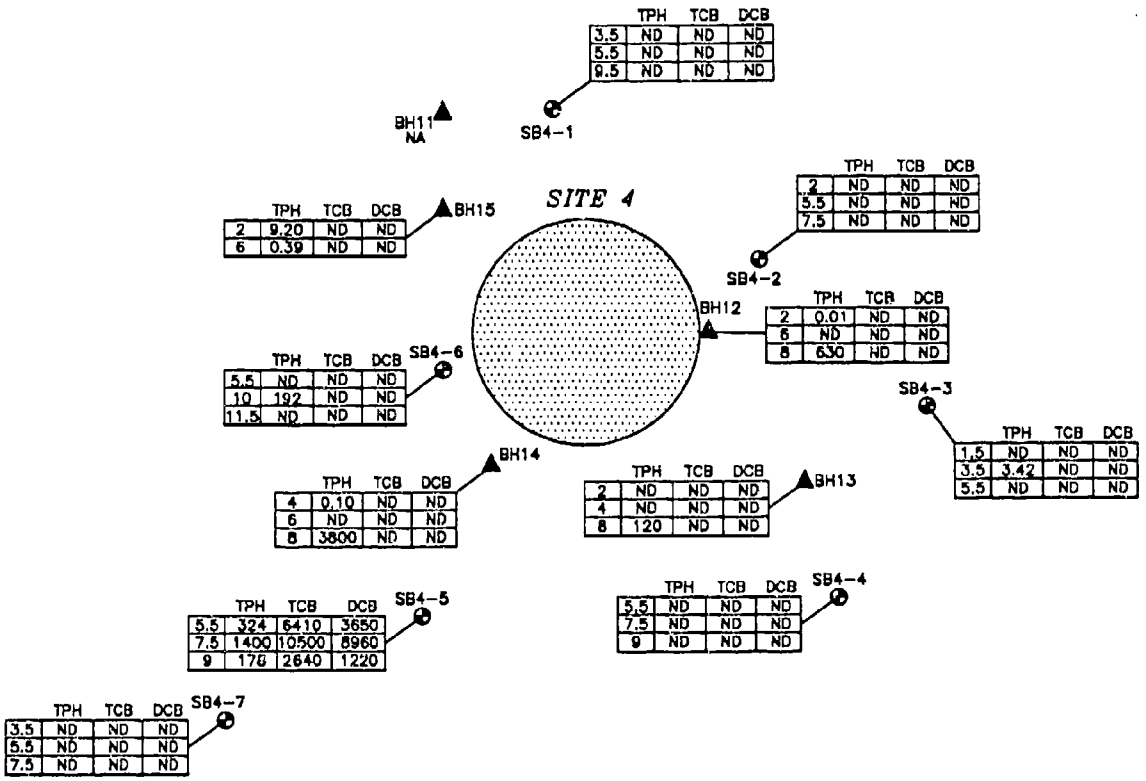
FEET

FIGURE 5-9

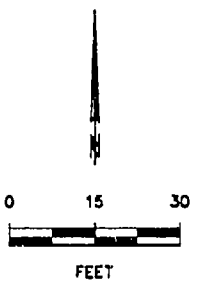
F:\HOME\SHARON\RENO\NEWRENO\9533F5-8.DWG

IRP SITE 4 – FORMER FTA,
TOTAL VOLATILE ORGANIC COMPOUNDS AND SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM



EXPLANATION



CONCENTRATION IN MILLIGRAMS PER KILOGRAM

CONCENTRATION IN MICROGRAMS PER KILOGRAM

DEPTH, FEET BELOW GROUND LEVEL

	TPH	TCB	DCB
5.5	ND	ND	ND
10	192	ND	ND
11.5	ND	ND	ND

ND NOT DETECTED
NA NOT SAMPLED

TPH = TOTAL PETROLEUM HYDROCARBONS
TCB = 1,2,4-TRICHLOROBENZENE
DCB = 1,4-DICHLOROBENZENE

ORIGINAL IRP SITE

SB4-4 SOIL BORING – REMEDIAL INVESTIGATION

BH13 SOIL BORING – SITE INVESTIGATION

FIGURE 5-10

F:\HOME\SHARON\RENO\NEWRENO\95335-9.DWG

IRP SITE 4 – FORMER FTA,
TOTAL PETROLEUM HYDROCARBONS AND
SELECTED ORGANIC COMPOUNDS IN SOIL
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

problems encountered by the analytical laboratory. For the purpose of this RI Report, the analytical data for the July 1995 sampling event supersede the VOC analysis of the original RI samples collected in May 1995. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995.

Ground water sampling and screening procedures are described in detail in Section 4.4. Table 5-3 summarizes the ground water sampling program for chemical analysis.

Complete analytical results for ground water samples collected from monitoring wells at Site 4 - Former FTA are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory analyses are presented in Tables 5-7 through 5-9. Section 2.3.1 presents a summary of ground water chemical quality data collected from Site 4 - Former FTA monitoring wells prior to the RI.

5.3.4.1 Volatile Organic Compounds. VOCs were not detected in RI ground water samples collected from monitoring well MW03. Several VOCs were detected in ground water samples collected from monitoring wells MW04, MW05, and MW28: TCE (0.5 to 12 µg/l), benzene (9 to 23 µg/l), ethylbenzene (14 to 150 µg/l), toluene (15 to 50 µg/l), total xylenes (0.4 to 690 µg/l), chlorobenzene (1 µg/l), 1,2-dichlorobenzene (0.4 to 13 µg/l), 1,3-dichlorobenzene (0.5 to 4.1 µg/l), and 1,4-dichlorobenzene (0.5 to 5.3 µg/l). Methylene chloride was the only VOC detected in monitoring well MW29 ground water samples. Detection of this compound is considered to be indicative of laboratory contamination because methylene chloride was also detected at a similar concentration in an associated trip blank (Table 5-7).

Figure 5-11 shows the horizontal extent of benzene in Site 4 - Former FTA ground water. Figures 5-12, 5-13, and 5-13A show the horizontal extent of TCE in ground water in the two areas where the compound has been detected in ground water underlying the NVANG Base: monitoring well MW05 at Site 4 - Former FTA and monitoring well MW08 at Site 12 - Aircraft Parking Apron Area.

5.3.4.2 Semivolatile Organic Compounds. SVOCs were not detected in RI ground water samples collected from monitoring wells MW03 and MW04. SVOCs were detected in ground water samples collected from monitoring wells MW05, MW28, and MW29 (Table 5-8). Naphthalene was detected at concentrations ranging from of 7 to 16 µg/l in ground water samples collected from monitoring well MW05. Bis(2-ethylhexyl)phthalate was detected in ground water samples collected from monitoring well MW28 at a concentration of 2 µg/l. 1,2-dichlorobenzene was detected in ground water samples collected from monitoring well MW29 at concentrations ranging from 1.5 to 3 µg/l.

TABLE 5-7

Volatile Organic Compounds Detected in Site 4 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per liter													
Location Identifier	Date Sampled	Laboratory Number	Chlorobenzene	Chloroform	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methlyene Chloride	TCE	Benzene	Ethylbenzene	Toluene	m-Xylene	o-Xylene	p-Xylene	Total Xylenes
MW03	5/14/95	88123	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
MW03	8/23/95	114163-0007-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW03	11/16/95	115997-0001-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW04	7/12/95	91895	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND (UZ)	ND	ND (UZ)	--
MW04*	7/12/95	91896	ND	0.86 (J)	ND	ND	ND	ND	ND	ND	ND	ND	ND (UZ)	ND	ND (UZ)	--
MW04	8/23/95	114163-0008-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW04	11/15/95	115954-0016-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW05	7/13/95	91883	ND	ND	ND	ND	ND	4	5	9	14	15	ND	90	155	--
MW05*	7/13/95	91884	ND	ND	ND	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	--
MW05	8/24/95	114200-0002-SA	ND	ND	3.1	1.3	1.2	ND	12	23	150	50	--	--	--	690
MW05	11/16/95	115997-0005-SA	2.4	ND	13	4.1	5.3	ND	4.1	2.5	2.2	1.1	--	--	--	24
MW05*	11/16/95	115997-0006-SA	2.1	ND	5.8	1.6	2.2	ND	8.8	5.8	3.3	5.7	--	--	--	53
MW28	7/12/95	91894	1	ND	7	3	3	.3 (J)	.5 (J)	ND	ND	ND	.4 (J)	ND	ND (UZ)	--
MW28	8/23/95	114163-0002-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW28	11/15/95	115954-0015-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW29	7/12/95	91881	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
MW29*	7/12/95	91882	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
MW29	8/23/95	114163-0003-SA	ND	ND	1.5	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW29	11/15/95	115954-0014-SA	1.2	ND	8	2.4	3.3	ND	ND	ND	ND	ND	--	--	--	ND
		MCL	100	30	600	600	75	5	5	5	700	1,000	NA	NA	NA	10,000
		Cleanup Level	100	NA	600	600	75	NA	5	5	700	1,000	NA	NA	NA	10,000

* = duplicate
ND = not detected
TCE = trichloroethylene
(--) = not reported
MCL = maximum contaminant level
NA = not available

TABLE 5-8

Semivolatile Organic Compounds Detected in Site 4 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per liter						
Location Identifier	Date Sampled	Laboratory Number	1,2-Dichlorobenzene	2,4-Dimethylphenol	2-Methyl-naphthalene	Phenanthrene	Naphthalene	bis (2-Ethylhexyl)-phthalate	Di-n-octyl phthalate
MW03	05/14/95	88123	ND	ND	ND	ND	ND	ND	ND
MW03	08/23/95	114163-0007-SA	ND	ND	ND	ND	ND	ND	ND
MW03	11/16/95	115997-0001-SA	ND	ND	ND	ND	ND	ND	ND
MW04	05/25/95	88867	ND	ND	ND	ND	ND	ND	ND
MW04	08/23/95	114163-0008-SA	ND	ND	ND	ND	ND	ND	ND
MW04	11/15/95	115954-0016-SA	ND	ND	ND	ND	ND	ND	ND
MW05	05/24/95	88779	ND (J)	ND	ND	ND	7 (J)	ND	ND
MW05	08/24/95	114200-0002-SA	ND	ND	ND	ND	16	ND	ND
MW05	11/16/95	115997-0005-SA	ND	ND	ND	ND	ND	ND	ND
MW05*	11/16/95	115997-0006-SA	ND	ND	ND	ND	ND	ND	ND
MW28	05/24/95	88782	ND	ND	ND	ND	ND	2 (J)	ND
MW28	08/23/95	114163-0002-SA	ND	ND	ND	ND	ND	ND	ND
MW28	11/15/95	115954-0015-SA	ND	ND	ND	ND	ND	ND	ND
MW29	05/24/95	88780	3 (J)	ND	ND	ND	ND	ND	ND
MW29*	05/24/95	88781	ND	ND	ND	ND	ND	ND	ND
MW29	08/22/95	114163-0003-SA	0.5	ND	ND	ND	ND	ND	ND
MW29	11/15/95	115954-0014-SA	ND	ND	ND	ND	ND	ND	ND
		MCL	600	NA	NA	NA	NA	6	NA
		Cleanup Level	600	700	1,400	1,400	1,400	6	700

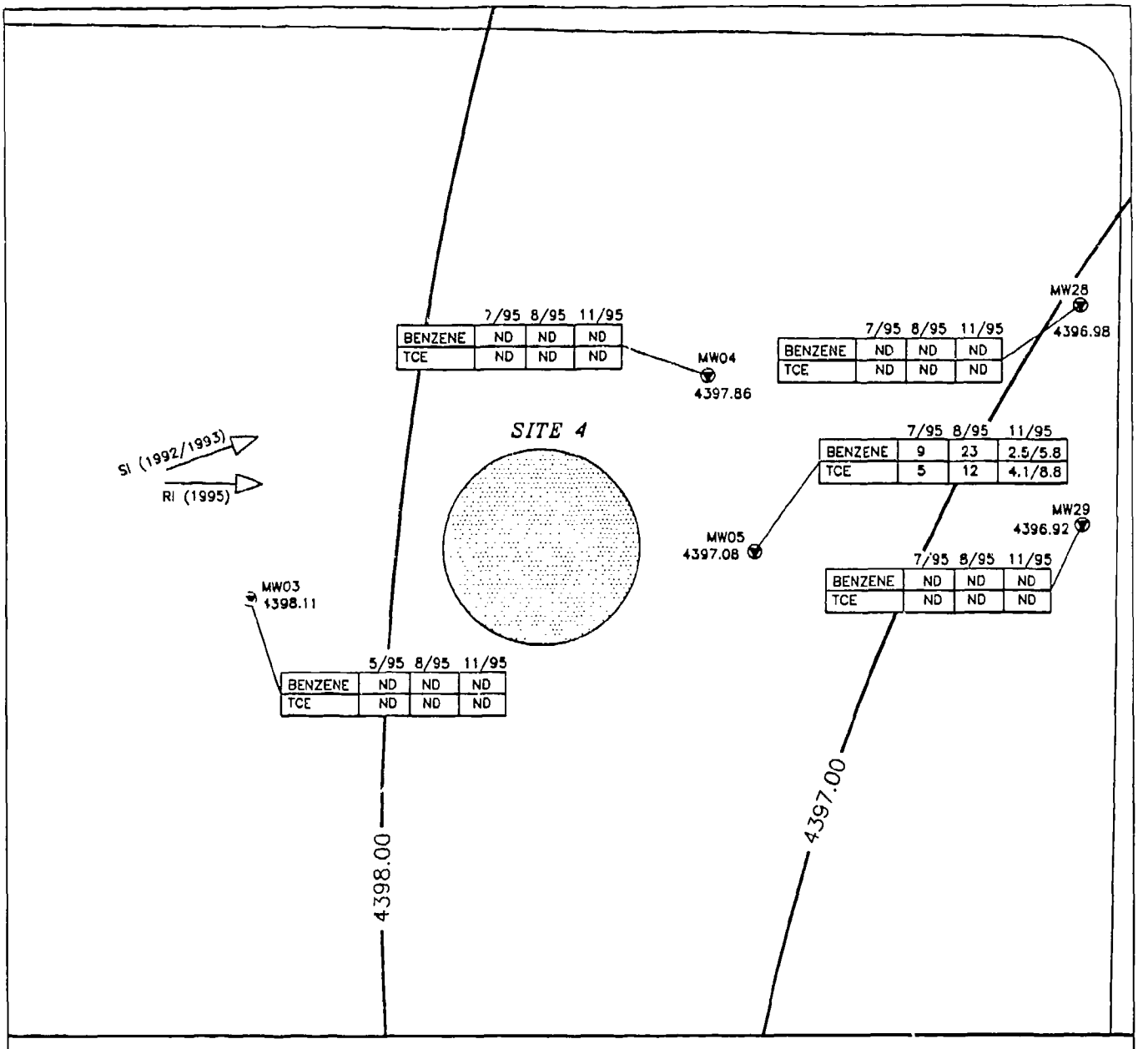
* = duplicate
ND = not detected
(–) = not reported
MCL = maximum contaminant level
NA = not available

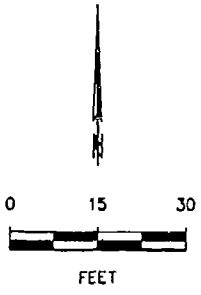
TABLE 5-9

Total Petroleum Hydrocarbons Detected in Site 4 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, µg/l
MW03	5/14/95	88123	ND
MW03	8/23/95	114163-0007-SA	ND
MW03	11/16/95	115997-0001-SA	ND
MW04	5/25/95	88867	ND
MW04	8/23/95	114163-0008-SA	ND
MW04	11/15/95	115954-0016-SA	ND
MW05	5/24/95	88779	2,100
MW05	8/24/95	114200-0002-SA	5,000
MW05	11/16/95	115997-0005-SA	1,300
MW05*	11/16/95	115997-0006-SA	1,000
MW28	5/24/95	88782	ND
MW28	8/23/95	114163-0002-SA	ND
MW28	11/15/95	115954-0015-SA	ND
MW29	5/24/95	88780	ND
MW29*	5/24/95	88781	ND
MW29	8/23/95	114163-0003-SA	ND
MW29	11/15/95	115954-0014-SA	ND

* = duplicate
TPH = total petroleum hydrocarbons
µg/l = micrograms per liter
ND = not detected





EXPLANATION

4398.0 — AUGUST 1995 ELEVATION OF POTENTIOMETRIC SURFACE, IN FEET ABOVE MEAN SEA LEVEL

ORIGINAL IRP SITE

MW05 4397.08 — MONITORING WELL LOCATION, WATER LEVEL ELEVATION, IN FEET ABOVE MEAN SEA LEVEL

9 — CONCENTRATION IN MICROGRAMS PER LITER

ND — NOT DETECTED

GROUND WATER FLOW DIRECTION

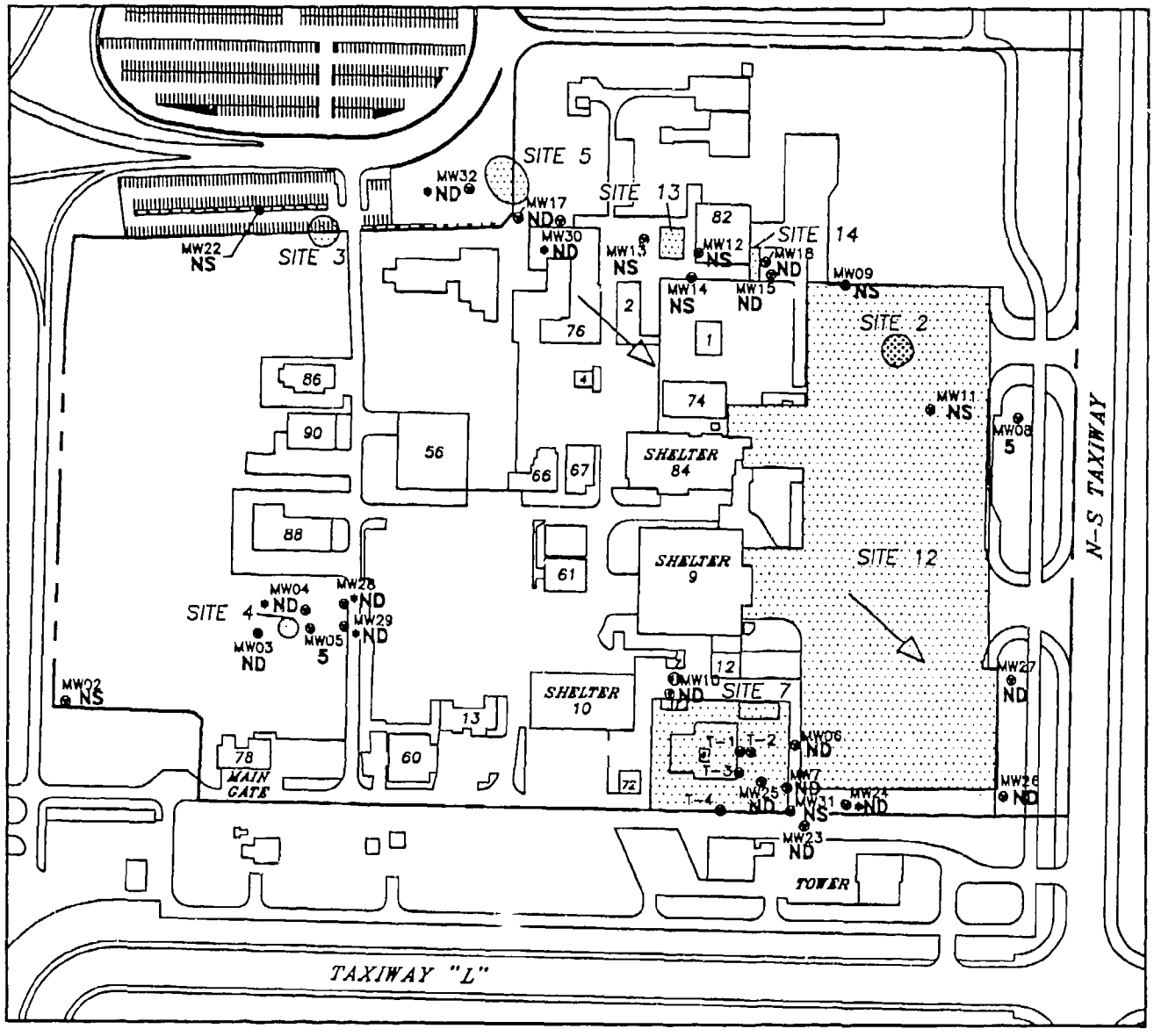
FIGURE 5-11

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IRP SITE 4 – FORMER FTA, SELECTED VOLATILE ORGANIC COMPOUNDS IN GROUND WATER

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM



EXPLANATION

ORIGINAL IRP SITE

BASE BOUNDARY

MW03 MONITORING WELL LOCATION

5 TCE IN MICROGRAMS PER LITER

ND TCE NOT DETECTED

NS GROUND WATER SAMPLE NOT COLLECTED

• WELL SAMPLED IN JULY 1995

GROUND WATER FLOW DIRECTION

N

0 150 300

FEET

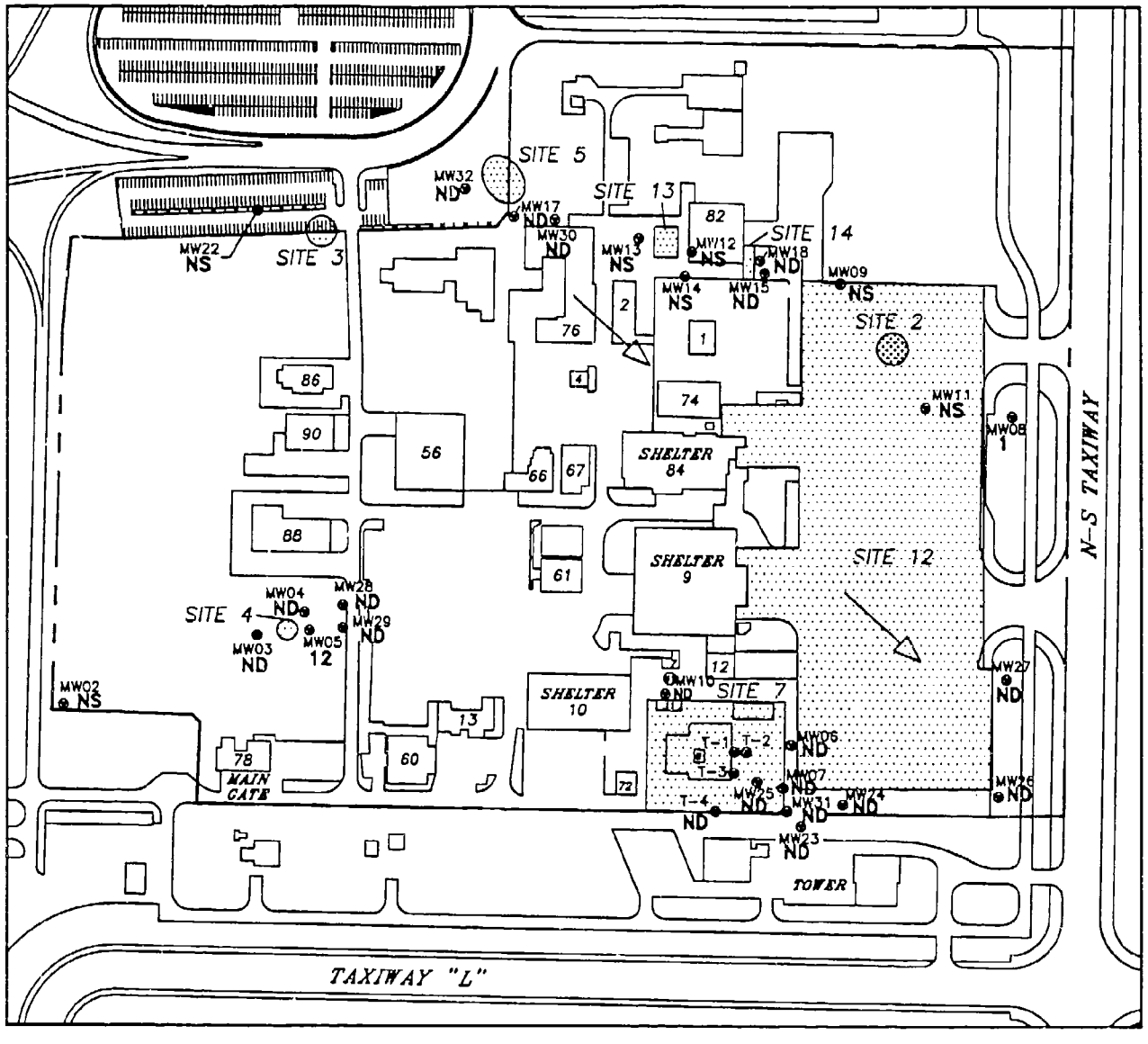
FIGURE 5-12

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TRICHLOROETHYLENE CONCENTRATIONS IN GROUND WATER, MAY 1995

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM



EXPLANATION

- ORIGINAL IRP SITE
- BASE BOUNDARY
- MW03 — MONITORING WELL LOCATION
- 5 — TCE IN MICROGRAMS PER LITER
- ND — TCE NOT DETECTED
- NS — GROUND WATER SAMPLE NOT COLLECTED
- GROUND WATER FLOW DIRECTION

0 150 300

FEET

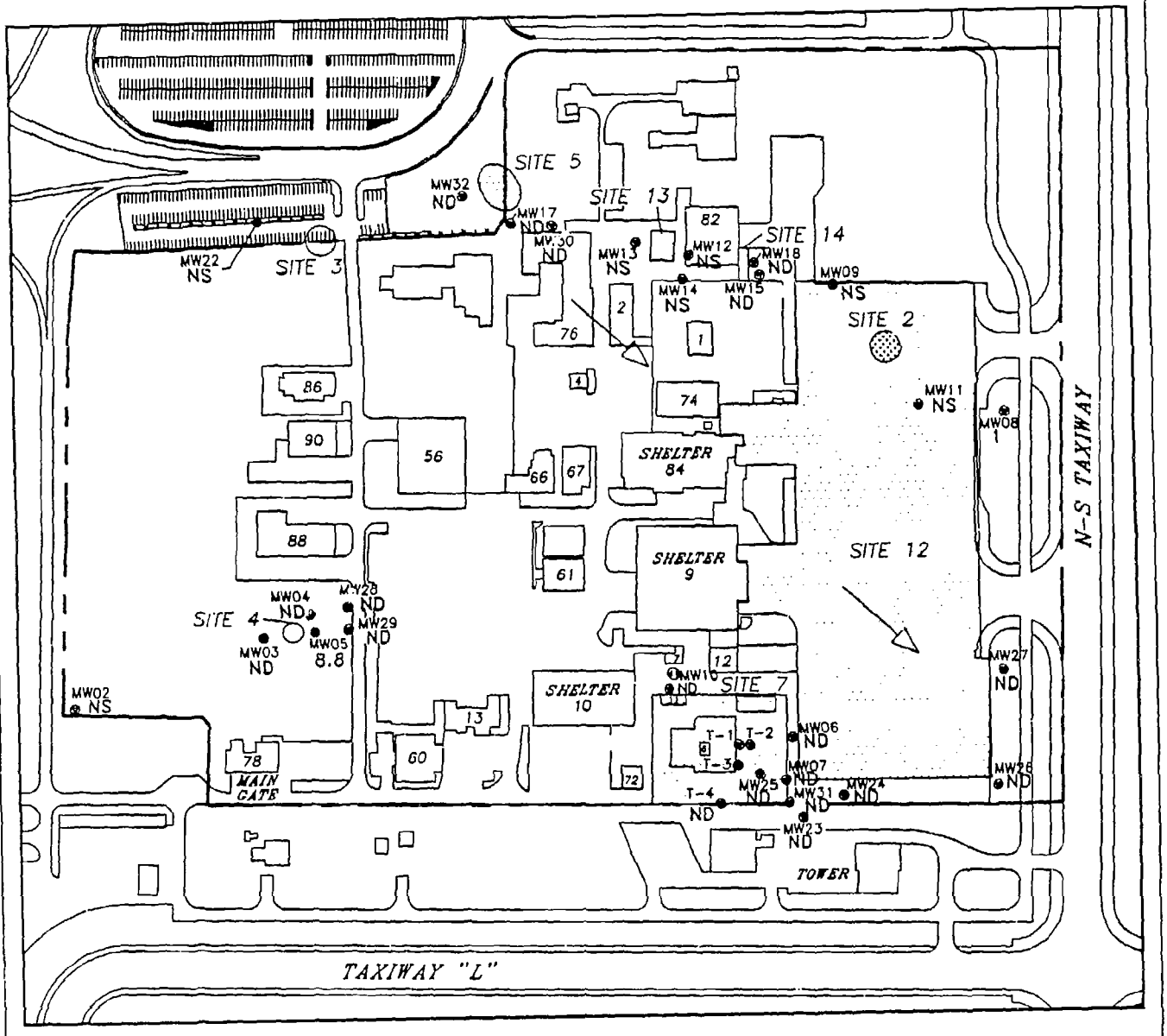
FIGURE 5-13

F:\HOME\SHARON\RENO\NEWRENO\9535-11A.DWG

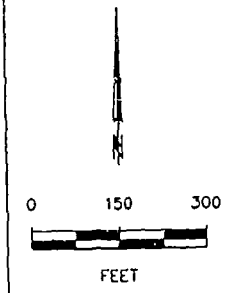
TRICHLOROETHYLENE CONCENTRATIONS IN GROUND WATER, AUGUST 1995

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM



EXPLANATION



ORIGINAL IRP SITE

BASE BOUNDARY

MW03 MONITORING WELL LOCATION

5 TCE IN MICROGRAMS PER LITER

ND TCE NOT DETECTED

NS GROUND WATER SAMPLE NOT COLLECTED

GROUND WATER FLOW DIRECTION

FIGURE 5-13A

F:\HOME\SHARON\RENO\NEWRENO\9535-118.DWG

TRICHLOROETHYLENE CONCENTRATIONS IN GROUND WATER, NOVEMBER 1995

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

5.3.4.3 Total Petroleum Hydrocarbons and Lead. TPH were detected only in RI ground water samples collected from monitoring well MW05 (2,100 to 5,000 µg/l), Table 5-9. Lead was not detected in RI ground water samples collected from monitoring wells MW03, MW04, MW05, MW28, and MW29.

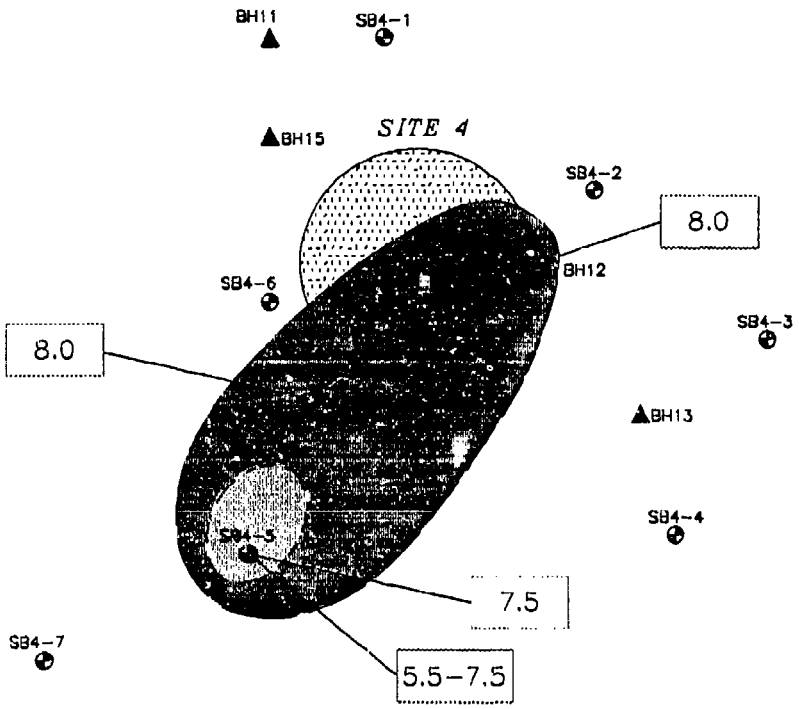
5.3.5 Conclusions

ERM compared the results of SI and RI soil and ground water chemical analyses for Site 4 - Former FTA to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas of ground water and soils that may require remediation. The results of the comparison indicated that the following compounds equaled or exceeded cleanup standards in one or more RI and/or SI samples:

- Ground water: TCE and benzene; and
- Soil: TPH, 1,2,4-trichlorobenzene (1,2,4-TCB), and 1,4-dichlorobenzene (1,4-DCB).

Figure 5-14 depicts the approximate area where organic compounds in soils exceed cleanup standards. This figure also shows the collection depths of those soil samples in which the TPH, 1,2,4-TCB and 1,4-DCB exceeded cleanup goals. In general, the area of soils exceeding cleanup standards is relatively small and is in the immediate vicinity of soil borings SB4-5, BH14, and BH12. This area is located immediately upgradient from monitoring well MW05 and potentially provides a continuing source of petroleum-derived hydrocarbons and other VOCs to Site 4 - Former FTA ground water. It is recommended that an FS be performed for Site 4 - Former FTA soils based on the potential threat to ground water quality posed by TPH, 1,2,4-TCB, and 1,4-DCB.

Figure 5-15 depicts the approximate area where organic compounds in ground water exceed cleanup standards with respect to TCE and benzene. This area is confined to the immediate vicinity of monitoring well MW05. When first sampled in March 1992, TCE and benzene concentrations in monitoring well MW05 ground water samples were 20 and 18 µg/l, respectively. Ground water samples collected from monitoring well MW05 in July 1995 contained lower concentrations of TCE and benzene. Because an area of upgradient soils appear to be the source of benzene and other VOCs to ground water, remedial activities performed for Site 4 - Former FTA soils is likely to result in further reduction in concentrations of these compounds in ground water. Therefore, it is recommended that long-



EXPLANATION

SB4-6 SOIL BORING – REMEDIAL INVESTIGATION

BH11 SOIL BORING – SITE INVESTIGATION

5.5–7.5 DEPTHS AT WHICH TOTAL PETROLEUM HYDROCARBONS EXCEED REGULATORY LEVELS (FEET BELOW GROUND LEVEL)

7.5 DEPTH AT WHICH 1,2,4–TRICHLOROBENZENE AND 1,4–DICHLOROBENZENE EXCEED REGULATORY LEVELS (FEET BELOW GROUND LEVEL)

ORIGINAL IRP SITE

0 30

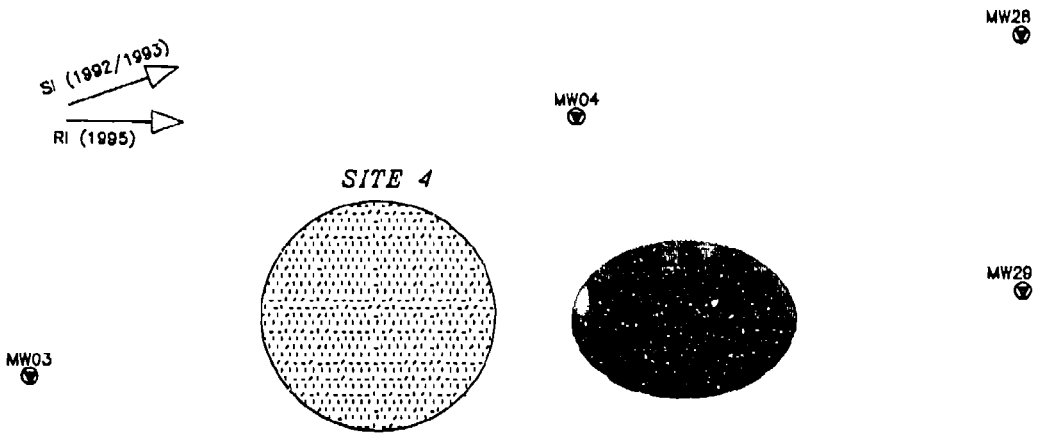
FIGURE 5–14

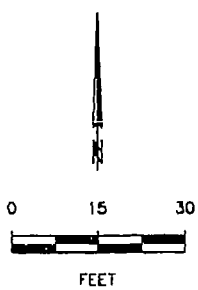
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AREA OF IRP SITE 4 – FORMER FTA, SOILS EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA

ERM





EXPLANATION

MW03 MONITORING WELL LOCATION

AREA OF GROUND WATER EXCEEDING REGULATORY LIMITS FOR TRICHLOROETHYLENE AND BENZENE

GROUND WATER FLOW DIRECTION

ORIGINAL IRP SITE

FIGURE 5--15

C:\RENOANG\9540\954OF515

AREA OF IRP SITE 4 – FORMER FTA, GROUND WATER EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA

ERM

term monitoring be performed for Site 4 - Former FTA ground water, based on the limited extent of ground water affected and based on the current declining concentration trend for TCE and benzene.

5.4 Site 5 - Former FTA

The following is a description of RI activities at IRP Site 5 - Former FTA, including geologic and hydrologic investigation results, screening results, soil and ground water investigation results, and conclusions.

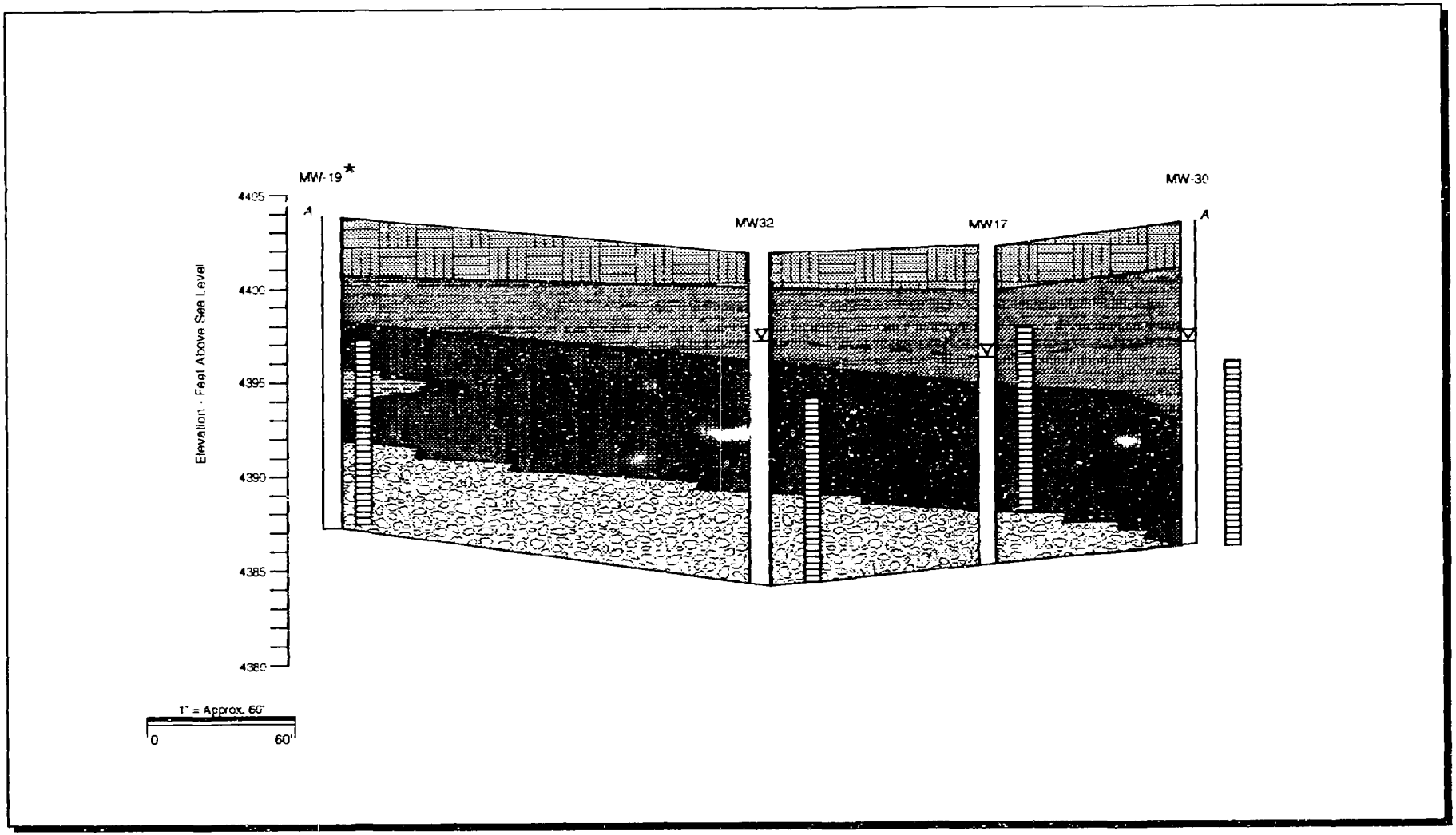
5.4.1 Geologic and Hydrologic Investigation Results

The subsurface encountered at Site 5 - Former FTA is comprised of fill material, yellowish-brown to gray-brown silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained, poorly graded sand, and very dark gray, well-graded sandy gravel with occasional cobbles and pale-gray to olive-brown sandy silt streaks. The geologic cross section presented in Figure 5-16 was constructed using lithologic data from monitoring wells MW17, MW19, MW30, and MW32.

Approximately 3 to 10 feet of fill material is present at Site 5 - Former FTA. The underlying silty clay reaches a maximum thickness of 6 feet in monitoring well MW17. At monitoring well MW17, the underlying well-graded sandy gravel is upwardly fining. At monitoring well MW19, the silty clay is underlain by 6 feet of well-graded gravelly sand that contains a 2-foot-thick silt lens. Underlying the gravelly sand is another 6 feet of poorly-graded, fine-grained, dark-olive sand. Actual thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 5 - Former FTA monitoring wells were evaluated and the ground water flow direction was determined to be to the southeast during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A.

Confined aquifer conditions were encountered during drilling all of the RI soil borings and monitoring wells at this site. The surficial silty clay layer serves as the confining unit for the underlying sand/gravelly sand aquifer. Figure 5-16 illustrates that water level elevations measured in monitoring wells MW17, MW30, and MW32 are approximately 2 to 6 feet above the base of the confining unit.



LEGEND

- Fill
- Silty Clay
- Sand
- Gravelly Sand
- Silt
- Screened Interval of Well
- Water Level Taken 5/95
- * Well Destroyed Prior to RI

LOCATION MAP

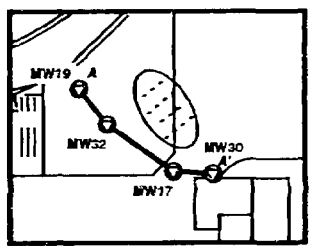


Figure 5-16
IRP Site 5-Former FTA
Geological Cross Section
152nd Tactical Reconnaissance Group, NVANG Base
Reno, Nevada

5.4.2 Screening Results

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.4.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB5-1 through SB5-4, located at Site 5 - Former FTA. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-10 summarizes the soil sampling program for chemical analysis.

Complete analytical results for soil samples collected from soil borings drilled at Site 5 - Former FTA are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analysis are presented in Tables 5-11 and 5-12. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB5-1-5.5 denotes the soil sample collected at soil boring SB5-1 at a depth of 5.5 to 6.0 feet bgs.

5.4.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB5-2 through SB5-4: 4-methyl-2-pentanone (41 µg/kg), acetone (13 to 277 µg/kg), ethylbenzene (211 µg/kg), toluene (255 µg/kg), and xylenes (15 to 2,040 µg/kg). In general, the highest VOC concentrations in Site 5 - Former FTA soil samples were detected in sample SB5-2-2 (Table 5-11 and Figure 5-17).

5.4.3.2 Semivolatile Organic Compounds. No SVOCs were detected in samples collected from Site 5 - Former FTA soil borings.

5.4.3.3 Total Petroleum Hydrocarbons. TPH were detected in only two samples collected from soil boring SB5-2 at concentrations ranging from 12.5 to 288 mg/kg (Table 5-12 and Figure 5-18).

5.4.4 Ground Water Investigation Results

Ground water samples were collected from Site 5 - Former FTA in May 1995 from monitoring wells MW17, MW30, and MW32. Monitoring wells MW30 and MW32 were resampled in July 1995 for VOC analysis

TABLE 5-10

Summary of Site 5 - Former FTA Soil and Ground Water Sample Collection Activities
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
Soil	SB5-1	5/21/95	1.5
	SB5-2	5/21/95	2, 3.5, 5.5, 7.5
	SB5-3	5/21/95	1.5, 3.5, 5.5, 7.5
	SB5-4	5/21/95	1.5, 3.5, 5.5, 7.0
Ground Water	MW17	5/12/95 8/24/95 11/14/95	NA
	MW30	5/25/95 7/13/95** 8/22/95 11/14/95	NA
	MW32	5/24/95 7/13/95** 8/22/95 11/14/95	NA

* = Sample depth listed is at the top of a 6-inch interval
** = Resampling date
NA = not applicable

TABLE 5-11

Volatile Organic Compounds Detected in Site 5 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilograms												
Location Identifier	Date Sampled	Laboratory Number	Acetone	Chlorobenzene	Chloroform	Methylene Chloride	2-Hexanone	2-Butanone	4-Methyl-2-pentanone	PCE	TCE	Benzene	Ethylbenzene	Toluene	Xylenes (total)
SB5-1-1.5	5/21/95	88584	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-2-2.0	5/21/95	88574	277	ND	ND	ND	ND	ND	ND	ND	ND	ND	211	255	2040
SB5-2-3.5	5/21/95	88575	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-2-7.5	5/21/95	88576	226	ND	ND	ND	ND	ND	41	ND	ND	ND	ND	ND	15
SB5-3-3.5	5/21/95	88577	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-3-5.5	5/21/95	88578	59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-3-7.5	5/21/95	88579	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-4-3.5	5/21/95	88580	21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-4-5.5	5/21/95	88581	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-4-5.5*	5/21/95	88582	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB5-4-7.0	5/21/95	88583	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	350,000	100,000	6,000	500	17,500	200,000	280,000	500	500	500	70,000	100,000	1,000,000

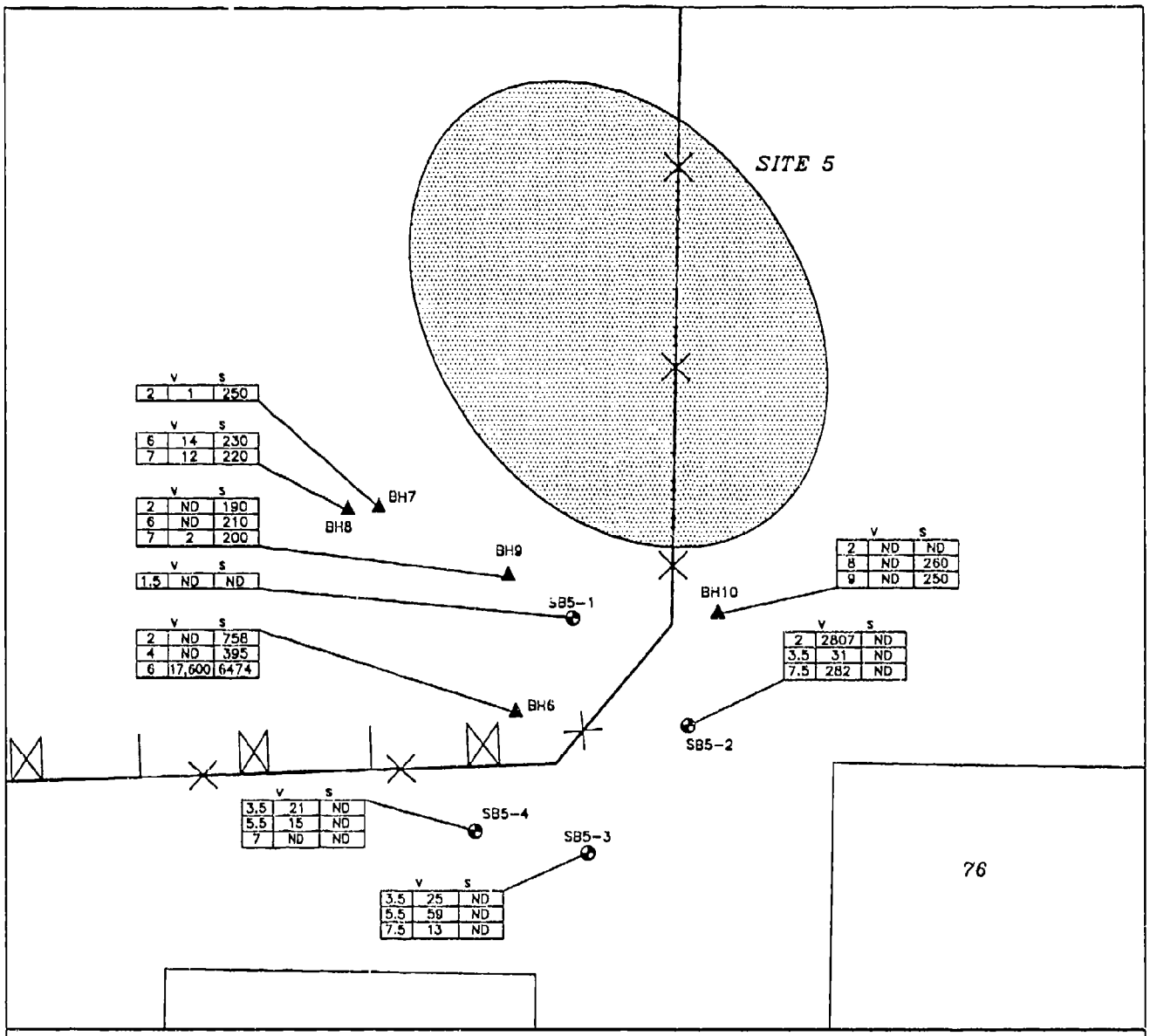
* = duplicate
PCE = tetrachloroethylene
TCE = trichloroethylene
ND = not detected

TABLE 5-12

Total Petroleum Hydrocarbons Detected in Site 5 - Former FTA Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB5-1-1.5	05/21/95	88584	ND
SB5-2-2.0	05/21/95	88574	288
SB5-2-3.5	05/21/95	88575	ND
SB5-2-7.5	05/21/95	88576	12.5
SB5-3-3.5	05/21/95	88577	ND
SB5-3-5.5	05/21/95	88578	ND
SB5-3-7.5	05/21/95	88579	ND
SB5-4-3.5	05/21/95	88580	ND
SB5-4-5.5	05/21/95	88581	ND
SB5-4-5.5*	05/21/95	88582	ND
SB5-4-7.0	05/21/95	88583	ND
		Cleanup Level	210

* = duplicate
mg/kg = milligrams per kilograms
TPH = total petroleum hydrocarbons
ND = not detected



EXPLANATION

SEMIVOLATILE ORGANIC COMPOUND

VOLATILE ORGANIC COMPOUND

DEPTH, FEET BELOW GROUND LEVEL

V	S
3.5	25 ND
5.5	59 ND
7	13 ND

CONCENTRATION IN MICROGRAMS PER KILOGRAM

ND NOT DETECTED

N

0 15 30

FEET

ORIGINAL IRP SITE

BASE BOUNDARY

SB5-2 SOIL BORING – REMEDIAL INVESTIGATION

BH10 SOIL BORING – SITE INVESTIGATION

FIGURE 5-17

IRP SITE 5 – FORMER FTA,
TOTAL ORGANIC COMPOUNDS AND TOTAL SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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ERM

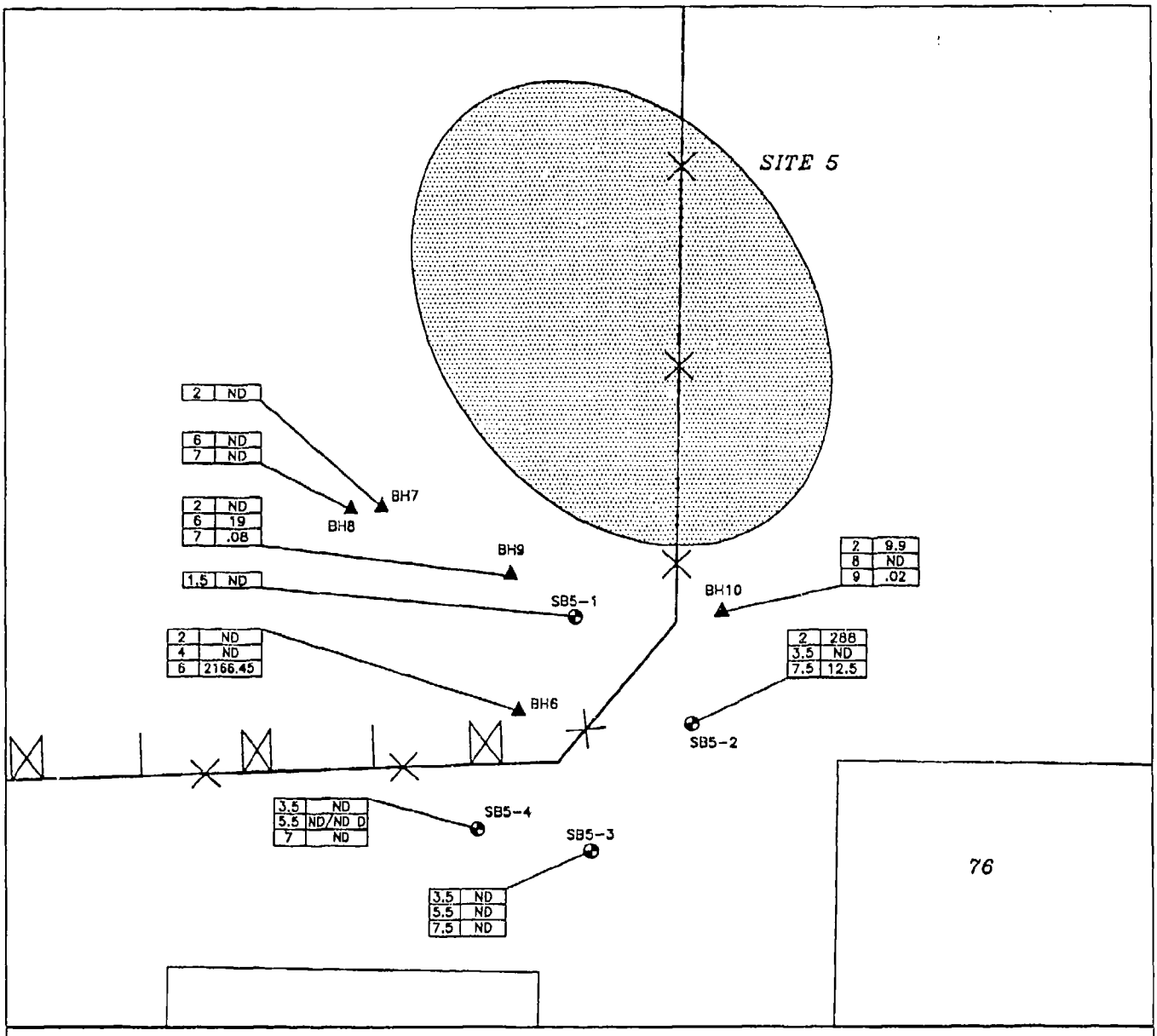


FIGURE 5-18

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IRP SITE 5 – FORMER FTA, TOTAL PETROLEUM HYDROCARBONS IN SOIL

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

due to quality control problems encountered by the analytical laboratory. For the purpose of this RI Report, the analytical data for the July 1995 sampling event supersede the VOC analysis of the original RI samples collected in May 1995. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995.

Ground water sampling and screening procedures are described in detail in Section 4.4. Table 5-10 summarizes the ground water sampling program for chemical analysis.

Complete analytical results for ground water samples collected from monitoring wells at Site 5 - Former FTA are available at the locations specified in Appendix F. A summary of detected compounds from the laboratory organic analyses are presented in Tables 5-13 and 5-14. Section 2.3.2 presents a summary of ground water chemical quality data collected from Site 5 - Former FTA monitoring wells prior to the RI.

5.4.4.1 Volatile Organic Compounds. Several VOCs were detected in ground water samples collected from monitoring well MW17: benzene (11 to 14 µg/l), ethylbenzene (3.8 to 20 µg/l), toluene (3 µg/l), and total xylenes (20 µg/l). Methylene chloride was detected in ground water samples collected from monitoring wells MW17, MW30, and MW32. Detection of this compound is considered to be indicative of laboratory contamination because methylene chloride was also detected at a similar concentration in an associated trip blank (Table 5-13). Figure 5-19 shows the distribution of benzene in Site 5 - Former FTA ground water.

5.4.4.2 Semivolatile Organic Compounds. SVOCs were not detected in RI ground water samples collected from monitoring wells MW17, MW30, and MW32.

5.4.4.3 Total Petroleum Hydrocarbons and Lead. TPH were not detected in RI ground water samples collected from monitoring wells MW30 and MW32 (Table 5-14). TPH were detected at concentrations ranging from 444 to 1,000 µg/l in ground water samples collected from monitoring well MW17. Lead was not detected in RI ground water samples collected from monitoring wells MW17, MW30, and MW32.

5.4.5 Conclusions

ERM compared the results of SI and RI soil and ground water chemical analyses for Site 5 - Former FTA to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas of ground water and soils that

TABLE 5-13

Volatile Organic Compounds Detected in Site 5 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per liter													
Location Identifier	Date Sampled	Laboratory Number	Chlorobenzene	Chloroform	1,2-Dichlor[illegible]ne	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methlyene Chloride	TCE	Benzene	Ethylbenzene	Toluene	m-Xylene	o-Xylene	p-Xylene	Total Xylenes
MW17	5/12/95	84079	ND	ND	ND	ND	ND	3	ND	14	20	3	ND	2	18	--
MW17	8/24/95	114200-0001-SA	ND	ND	ND	ND	ND	ND	ND	11	3.8	ND	--	--	--	ND
MW17	11/14/95	115954-0003-SA	ND	ND	ND	ND	ND	ND	ND	2.3	4.5	ND	--	--	--	ND
MW30	7/13/95	91886	ND	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	--
MW30	8/22/95	114124-0002-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW30	11/14/95	115954-0004-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW32	7/13/95	91897	ND	ND	ND	ND	ND	.2 (J)	ND	ND	ND	ND	ND (UZ)	ND	ND (UZ)	--
MW32	8/22/95	114124-0003-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
MW32	11/14/95	115954-0007-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	ND
		MCL	100	80	600	600	75	5	5	5	700	1,000	NA	NA	NA	10,000
		Cleanup Level	100	NA	600	600	75	NA	5	5	700	1,000	NA	NA	NA	10,000

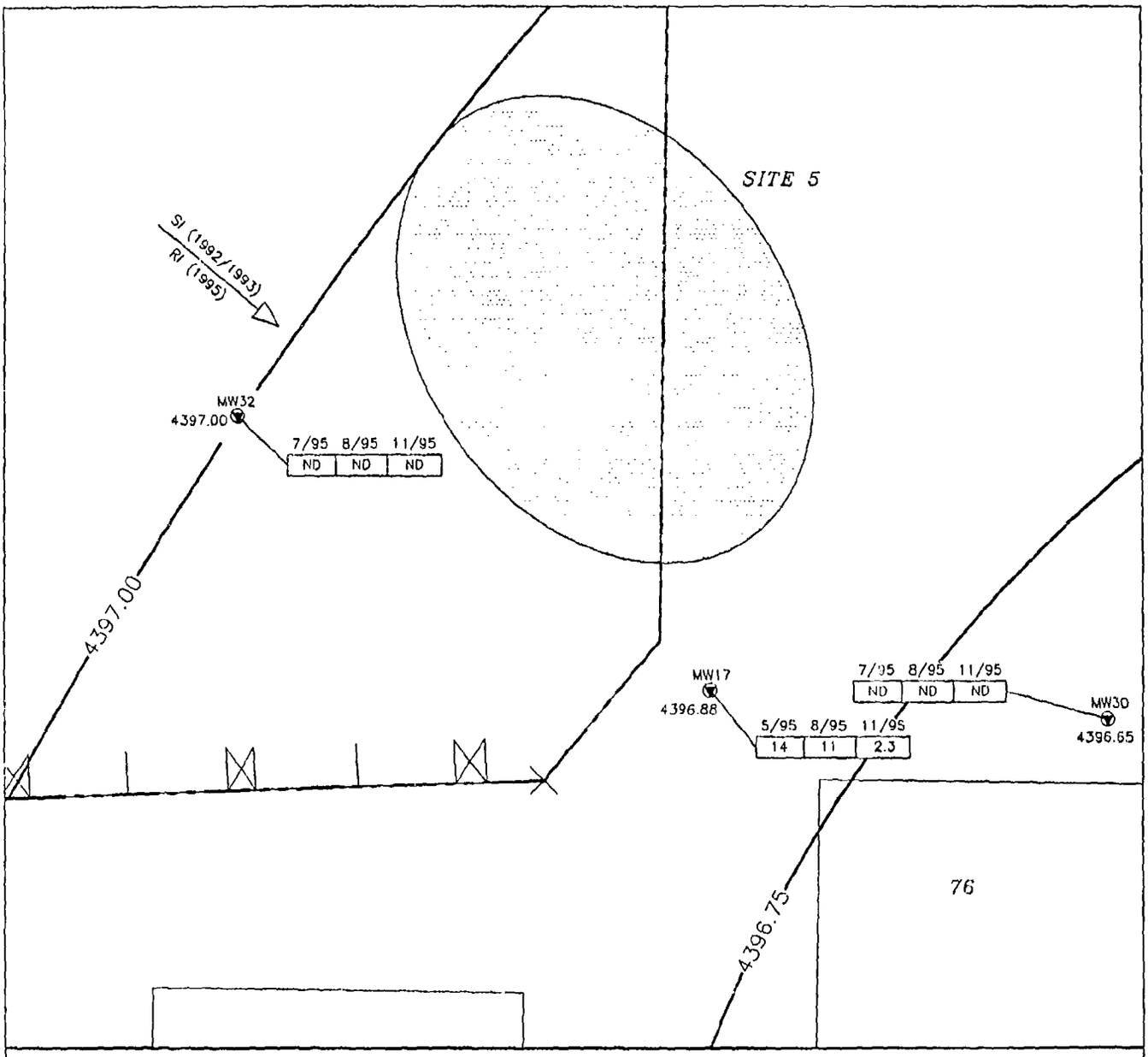
ND = not detected
TCE = trichloroethylene
(--) = not reported
MCL = maximum contaminant level
NA = not available

TABLE 5-14

Total Petroleum Hydrocarbons Detected in Site 5 - Former FTA Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, µg/l
MW17	5/12/95	88079	444
MW17	8/24/95	114200-0001-SA	1,000
MW17	11/14/95	115954-0003-SA	ND
MW30	5/25/95	88875	ND
MW30	8/22/95	114124-0002-SA	ND
MW30	11/14/95	115954-0004-SA	ND
MW32	5/25/95	88868	ND
MW32	8/22/95	114124-0003-SA	ND
MW32	11/14/95	115954-0007-SA	ND

TPH = total petroleum hydrocarbons
µg/l = micrograms per liter
ND = not detected



EXPLANATION

4397.00 — AUGUST 1995 ELEVATION OF POTENTIOMETRIC SURFACE, IN FEET ABOVE MEAN SEA LEVEL

ORIGINAL IRP SITE

BASE BOUNDARY

MW17 4396.88 — MONITORING WELL LOCATION, WATER LEVEL ELEVATION, IN FEET ABOVE MEAN SEA LEVEL

14 — BENZENE CONCENTRATION IN MICROGRAMS PER LITER

ND — BENZENE NOT DETECTED

GROUND WATER FLOW DIRECTION

0 15 30

FEET

FIGURE 5-19

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IRP SITE 5 - FORMER FTA, BENZENE CONCENTRATIONS IN GROUND WATER

152nd TACTICAL RECONNAISSANCE GROUP

NVANG, RENO, NEVADA

ERM

may require remediation. The results of the comparison indicated that the following compounds equaled or exceeded cleanup standards in one or more RI and/or SI samples:

- Ground water: benzene; and
- Soil: TPH.

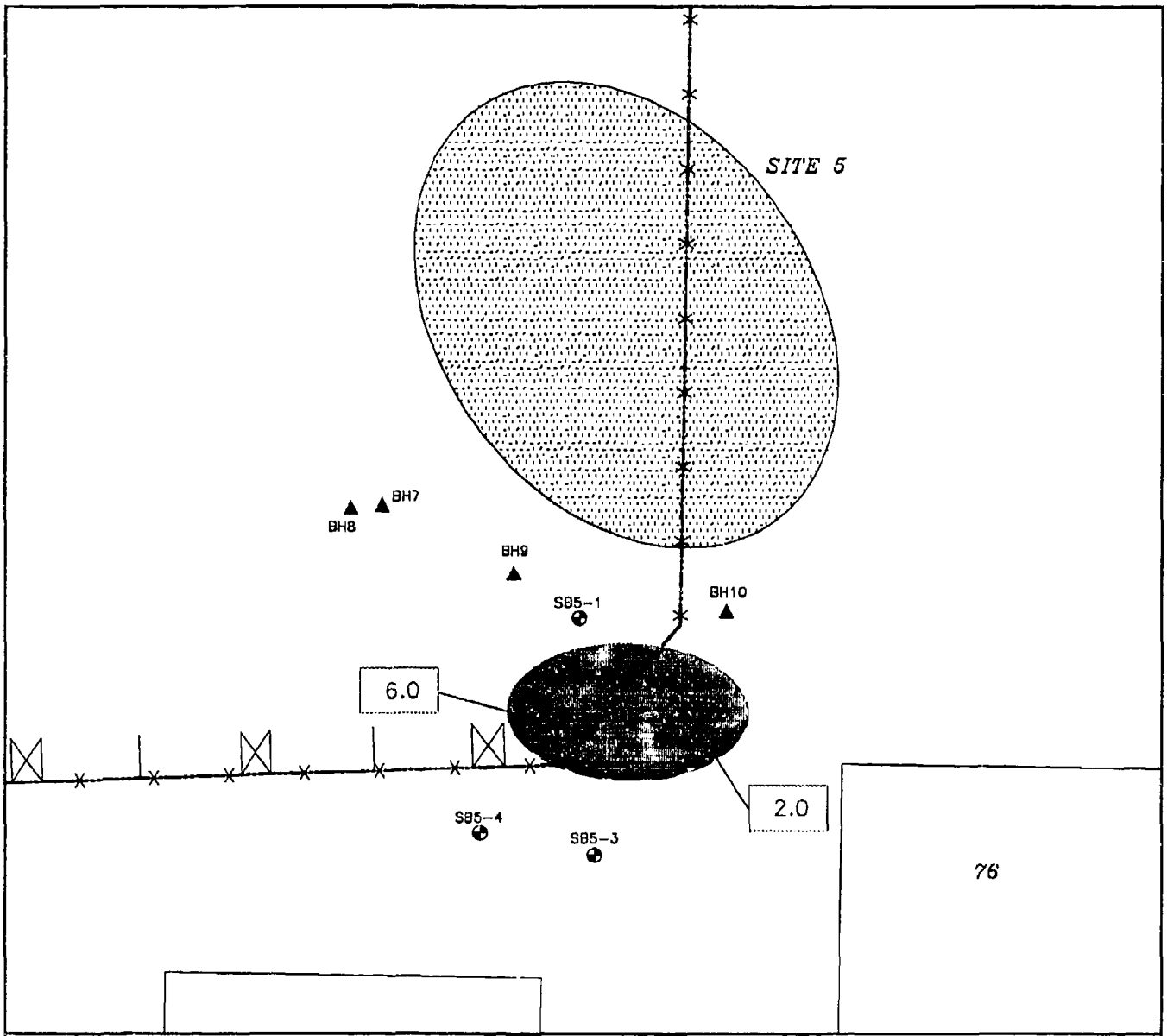
Figure 5-20 depicts the approximate area where TPH in soils exceeds cleanup standards. This figure also shows the collection depths of those soil samples in which TPH exceeded cleanup standards. In general, the area of soils exceeding cleanup standards is relatively small and is in the immediate vicinity of soil borings SB5-2 and BH6. The ground surface at soil boring SB5-2 is approximately 3 to 4 feet higher in elevation than the ground surface at soil boring BH6. Therefore, the soil horizon containing TPH impacted soil is approximately horizontal within the area depicted on Figure 5-20.

The area of TPH impacted soil is located in the immediate vicinity of monitoring well MW17 and potentially provides a continuing source of petroleum-derived hydrocarbons to Site 5 - Former FTA ground water. This soil area also lies partially on Airport property and partially on the NVANG Base. It is recommended that an FS be performed for Site 5 - Former FTA soils based on the potential threat to ground water quality posed by TPH and the fact that a portion of the TPH impacted soils lies off-Base.

Figure 5-21 depicts the approximate area where ground water exceeds cleanup standards with respect to benzene. This area is confined to the immediate vicinity of monitoring well MW17. Concentrations of benzene have remained relatively unchanged since the SI (15 µg/l in samples collected in March 1992 and 14 µg/l in samples collected in May 1995). Because an area of soil adjacent to monitoring well MW17 appears to be the source of benzene to ground water, remedial activities performed for Site 5 - Former FTA soils is likely to reduce benzene concentrations in ground water. However, since a portion of the estimated extent of benzene impacted ground water lies off-Base, it is recommended that a FS also be performed for Site 5 - Former FTA ground water.

5.5 Site 7 - POL Storage Area

The following is a description of RI activities at IRP Site 7 - POL Storage Area, including geologic and hydrologic investigation results,



EXPLANATION

- BASE BOUNDARY
- SB5-4 — SOIL BORING – REMEDIAL INVESTIGATION
- BH8 — SOIL BORING – SITE INVESTIGATION
- 6.0 — DEPTH AT WHICH TOTAL PETROLEUM HYDROCARBONS EXCEED REGULATORY LEVELS (FEET BELOW GROUND LEVEL)
- ORIGINAL IRP SITE

0 15 30

FEET

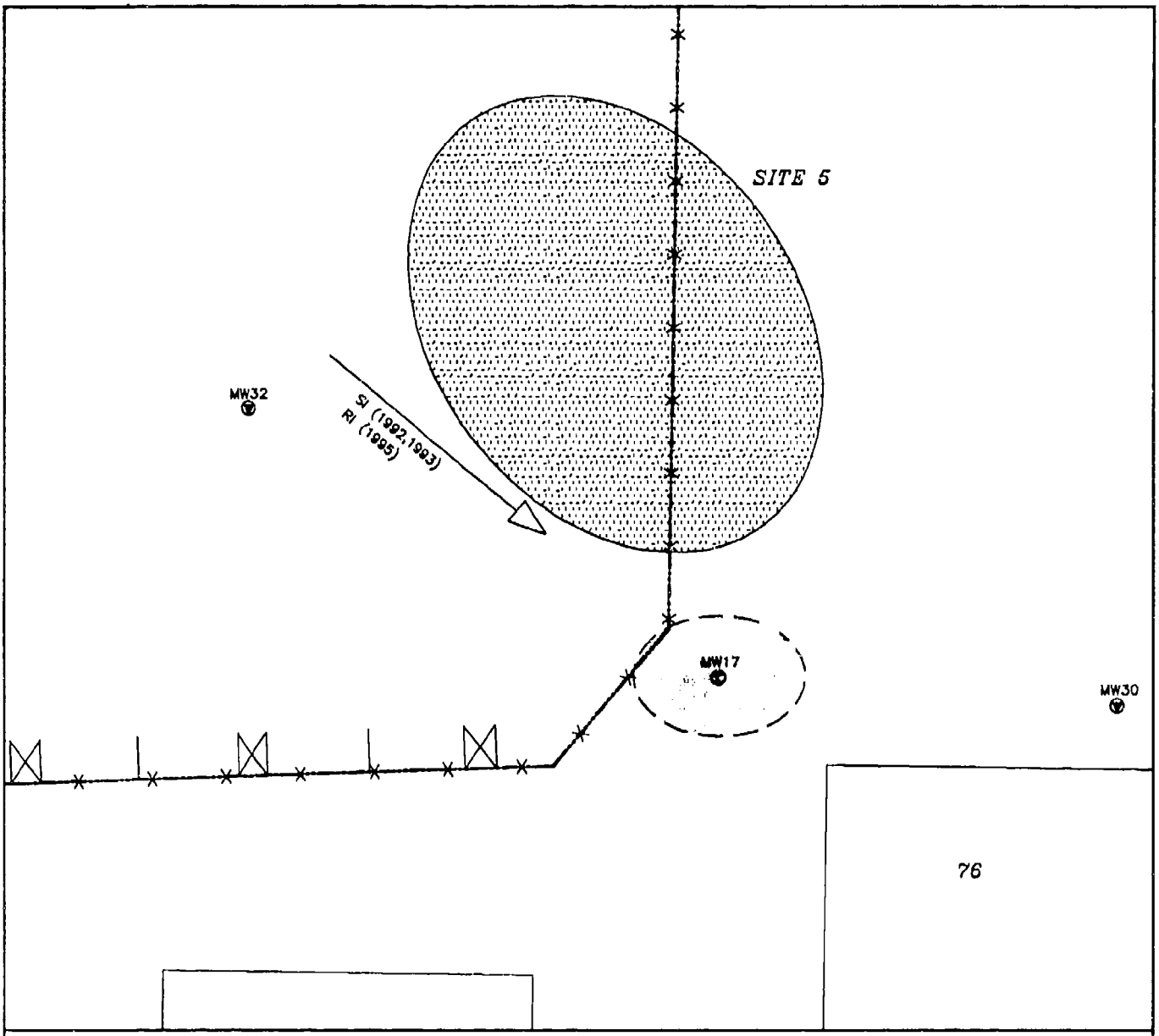
FIGURE 5-20

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AREA OF IRP SITE 5 – FORMER FTA, SOILS EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA

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EXPLANATION

- BASE BOUNDARY
- MW32 — MONITORING WELL LOCATION
- GROUND WATER FLOW DIRECTION
- GROUND WATER EXCEEDING REGULATORY LIMITS FOR BENZENE
- ORIGINAL IRP SITE

0 15 30

FEET

FIGURE 5-21

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AREA OF IRP SITE 5 – FORMER FTA, GROUND WATER EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA

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screening results, soil and ground water investigation results, and conclusions.

5.5.1 Geologic and Hydrologic Investigation Results

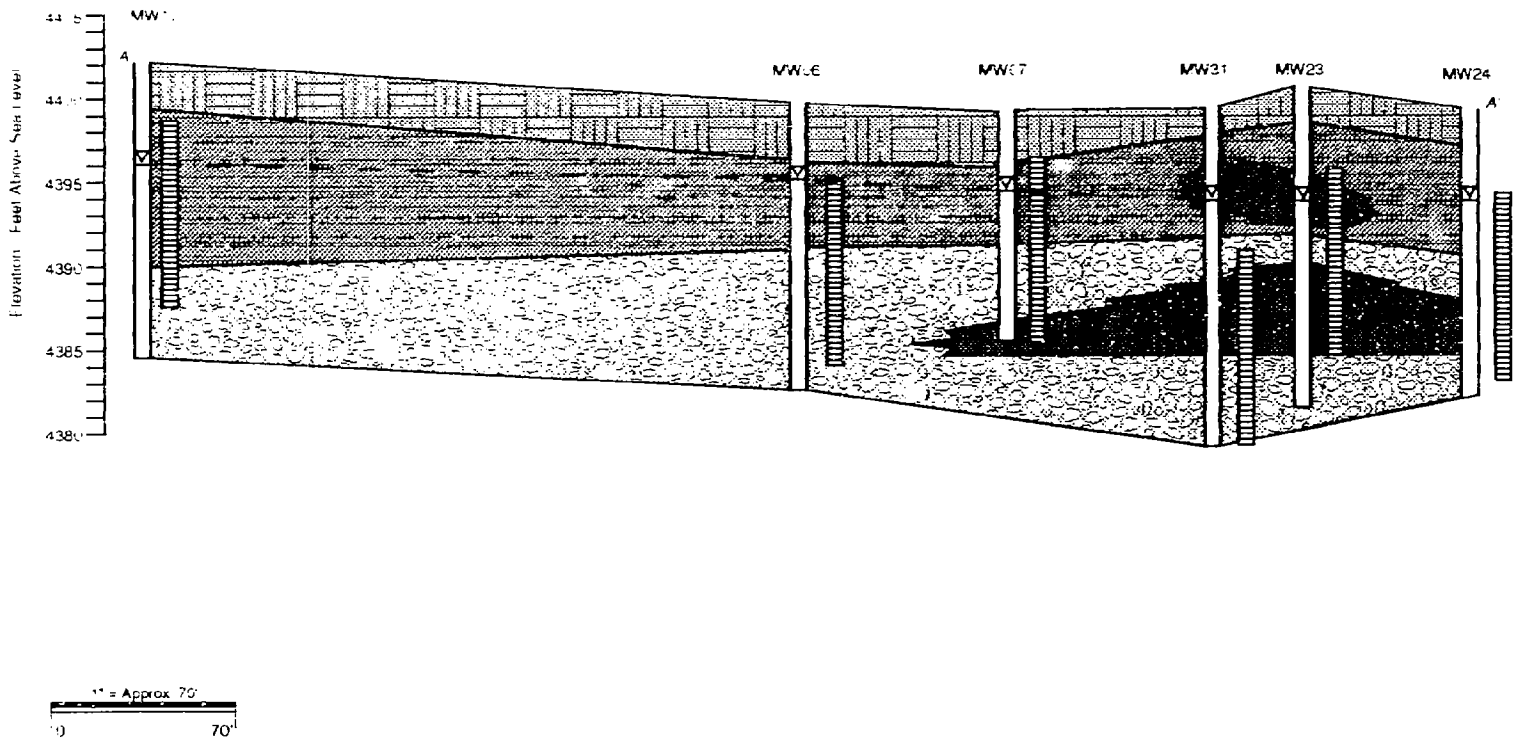
The subsurface encountered at Site 7 - POL Storage Area is comprised of fill material, yellowish-brown to gray-brown silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained poorly graded sand, and very dark gray, well-graded sandy gravel with occasional cobbles. The geologic cross section presented in Figure 5-22 was constructed using lithologic data from monitoring wells MW10, MW06, MW07, MW31, MW23, and MW24.

Up to 4 feet of fill material is present at Site 7 - POL Storage Area. The underlying silty clay reaches a maximum thickness of 8 feet in monitoring well MW10. In monitoring well MW23, the silty clay contains a lens of poorly graded sand. Generally, the silty clay is underlain by well-graded, sandy gravel that contains a lens of poorly graded sand between monitoring wells MW31 and MW23. Actual thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 7 - POL Storage Area monitoring wells were evaluated and the ground water flow direction was determined to be to the southeast during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A. Confined aquifer conditions were encountered during drilling of the RI soil borings and monitoring wells at this site. The surficial silty clay layer serves as the confining unit for the underlying sand/gravelly sand aquifer. Figure 5-22 illustrates that water level elevations measured in monitoring wells at the site are approximately 2 to 6 feet above the base of the confining unit. Unconfined aquifer conditions were encountered in the gravel backfill within the UST excavation area. At this location, the confining silty clay layer has been removed during the excavation process.

5.5.2 Screening Results

A surface geophysical survey using a magnetometer and ground penetrating radar was used to locate the surface extent of four USTs and associated piping at IRP Site 7 - POL Storage Area, and the extent of the excavated area around the tanks. The approximate area of the



LEGEND

- Fill
- Silty Clay
- Sand
- Gravelly Sand
- Screened Interval of Well
- Water Level Taken 5/95

LOCATION MAP

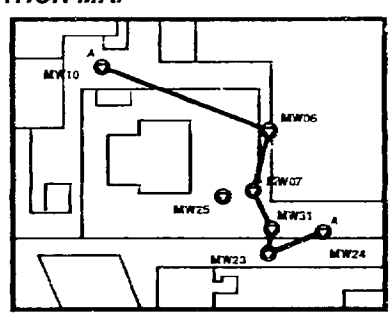


Figure 5-22
IRP Site 7-Pol Storage Area
Geological Cross Section
152nd Tactical Reconnaissance Group, NVANG Base
Reno, Nevada

ERM-West, Inc. 7/95
6001.41/WDK/08.01.95

excavation was mapped and is presented on all of the illustrations presented in this section.

The survey confirmed that the USTs were 10 feet in diameter and that approximately 3 feet of horizontal clearance exist between adjacent tanks. A subsurface electric power line was detected within the eastern end of the excavation, approximately 15 feet from the eastern end of the USTs. Presence of the power line provided a major constraint for drilling within the excavation.

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.5.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB7-1 through SB7-12 located at Site 7 - POL Storage Area. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-15 summarizes the soil sampling program for chemical analysis.

Complete analytical results for soil samples collected from soil borings drilled at Site 7 - POL Storage Area are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analysis are presented in Tables 5-16 through 5-18. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB7-3-5.5 denotes the soil sample collected at soil boring SB7-3 at a depth of 5.5 to 6.0 feet bgs.

5.5.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB7-1 through SB7-12: acetone (15 to 547 µg/kg), benzene (12 to 2,800 µg/kg), chloroform (9 to 12 µg/kg), ethylbenzene (30 to 37,900 µg/kg), methylene chloride (15 to 34 µg/kg), toluene (5 to 20,100 µg/kg), TCE (2 µg/kg), and xylenes (11 to 258,000 µg/kg). In general, the highest VOC concentrations in Site 7 - POL Storage Area soil samples were detected in sample SB7-7-1.5 (Table 5-16 and Figure 5-23). Figure 5-24 shows the areal and vertical distribution of benzene in soils.

5.5.3.2 Semivolatile Organic Compounds. SVOCs were detected in soil samples collected from soil borings SB7-1, SB7-2, SB7-3, SB7-5, SB7-7,

TABLE 5-15

Summary of Site 7 - POL Storage Area Soil and Ground Water Sample Collection Activities
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
Soil	SB7-1	5/19/95	2, 3.5, 5.5, 7.5
	SB7-2	5/19/95	1.5, 3.5, 5.5, 7.5
	SB7-3	5/19/95	1.5, 3.5, 5.5, 7.5
	SB7-4	5/19/95	1.5, 3.5, 5.5, 7.5
	SB7-5	5/20/95	1.5, 3.5, 5.5, 7.5
	SB7-6	5/20/95	1.5#, 3.5, 5.5#
	SB7-7	5/20/95	1.5, 3.5***, 5.5, 7.5
	SB7-8	5/20/95	3, 5.5, 7.5***
	SB7-9	5/23/95	1.5, 3.5, 5.5, 7.5, 8.0***
	SB7-10	5/23/95	0.5, 4, 5.5, 7
	SB7-11	5/23/95	1.5, 3.5, 5.5, 6.5***
	SB7-12	5/22/95	1.5, 3.5, 5.5, 7.5
Ground Water	MW06	5/13/95 8/24/95 11/16/95	NA
	MW07	5/13/95 8/24/95 11/16/95	NA
	MW10	5/14/95 8/23/95 11/16/95	NA
	MW23	5/14/95 8/22/95 11/15/95	NA
	MW24	5/25/95 7/13/95** 8/22/95 11/15/95	NA
	MW25	5/25/95 8/25/95 11/17/95	NA
	MW31	5/25/95 8/24/95 11/16/95	NA
Product	T-1	NA	NA
	T-2	NA	NA
	T-3 (extraction well)	NA	NA
	T-4	8/25/1995 11/17/95	NA

* = Sample depth listed is at the top of a 6-inch sample interval
** = Resampling date
*** = Field gas chromatograph only
NA = not applicable
No field gas chromatograph analysis performed

TABLE 5-16

Volatile Organic Compounds Detected in Site 7 - POL Storage Area Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram												
Location Identifier	Date Sampled	Laboratory Number	Acetone	Chlorobenzene	Chloroform	Methylene Chloride	2-Hexanone	2-Butanone	4-Methyl-2-pentanone	PCE	TCE	Benzene	Ethylbenzene	Toluene	Xylenes (total)
SB7-1-3.5	5/19/95	88443	95	ND	9 (J)	ND	ND	ND	ND	ND	ND	12 (J)	30 (J)	ND	110
1-5.5	5/19/95	88444	ND	ND	ND	ND	ND	ND	ND	ND	ND	150	3,800	12 (J)	9,300 (E)
1-7.5	5/19/95	88445	ND	ND	12 (J)	15 (JB)	ND	ND	ND	ND	ND	24 (J)	79	ND	290
2-3.5	5/19/95	88446	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,800 (E)	4,400 (D)	ND	10,000 (D)
2-3.5*	5/19/95	88447	100	ND	ND	ND	ND	ND	ND	ND	2 (J)	220	460	14	1000
2-5.5	5/19/95	88448	240	ND	ND	ND	ND	ND	ND	ND	ND	430	1,200 (D)	5 (J)	3,000 (D)
2-7.5	5/19/95	88449	430	ND	ND	ND	ND	ND	ND	ND	ND	1,400	2,300	ND	5,300
SB7-3-3.5	5/19/95	88434	184	ND	ND	ND	ND	ND	ND	ND	ND	ND	923	ND	5,560
SB7-3-5.5	5/19/95	88435	107	ND	ND	ND	ND	ND	ND	ND	ND	ND	995	ND	4,010
SB7-3-5.5*	5/19/95	88436	110	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,180	ND	5,140
SB7-3-7.5	5/19/95	88437	131	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	65
SB7-4-3.5	5/19/95	88438	62	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-5.5	5/19/95	88439	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-7.5	5/19/95	88440	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-3.5	5/20/95	88587	107	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-5.5	5/20/95	88588	ND	ND	ND	ND	ND	ND	ND	ND	ND	114	760	426	4,200
SB7-5-7.5	5/20/95	88589	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,310	1,900	20,100	62,100
SB7-6-1.5	5/20/95	88590	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-6-3.5	5/20/95	88591	57	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-6-5.5	5/20/95	88592	59	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-7-1.5	5/20/95	88593	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,430	37,900	101	258,000
SB7-7-5.5	5/20/95	88594	336	ND	ND	34	ND	ND	ND	ND	ND	71	715	ND	2,530
SB7-7-7.5	5/20/95	88595	ND	ND	ND	ND	ND	ND	ND	ND	ND	190	650	ND	1,570
SB7-8-3	5/20/95	88597	547	ND	ND	30	ND	ND	ND	ND	ND	ND	495	ND	1,660
SB7-8-5.5	5/20/95	88598	89	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11
SB7-8-5.5*	5/20/95	88599	81	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-1.5	5/23/95	88645	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-3.5	5/23/95	88646	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-5.5	5/23/95	88647	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17
SB7-10-4.0	5/23/95	88648	181	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-5.5	5/23/95	88649	101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	143
SB7-10-5.5*	5/23/95	88650	57	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25
SB7-10-7.0	5/23/95	88651	124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	86
SB7-11-1.5	5/23/95	88652	147	ND	ND	ND	ND	ND	ND	ND	ND	ND	118	ND	3,070
SB7-11-3.5	5/23/95	88653	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	517	ND	1,120
SB7-11-5.5	5/23/95	88654	ND	ND	ND	ND	ND	ND	ND	ND	ND	445	7,740	5,650	38,500
SB7-12-3.5	5/22/95	88641	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-5.5	5/22/95	88642	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-7.5	5/22/95	88643	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-7.5*	5/22/95	88644	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Cleanup Level		350,000	100,000	6,000	500	17,500	200,000	280,000	500	500	500	70,000	100,000	1,000,000

* = duplicate
PCE = tetrachloroethylene
TCE = trichloroethylene
ND = not detected

TABLE 5-17

Semivolatile Organic Compounds Detected in Site 7 - POL Storage Area Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram													
Location Identifier	Date Sampled	Laboratory Number	Acenaphthene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Carbazole	Chrysene	Dibenzofuran	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2,4-Dichloro-phenol
SB7-1-3.5	5/20/99	88443	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-1-5.5	5/20/99	88444	120 (J)	170 (J)	230 (J)	120 (J)	100 (J)	52 (J)	96 (J)	ND	240 (J)	54 (J)	ND	ND	ND	ND
SB7-1-7.5	5/20/99	88445	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-2-3.5	5/20/99	88446	70 (J)	120 (J)	290 (J)	220 (J)	240 (J)	130 (J)	210 (J)	81 (J)	370 (J)	ND	ND	ND	ND	ND
SB7-2-3.5*	5/20/99	88447	170 (J)	840	2,800	2,400	3,300	2,000	2,400	940	3,900	300	ND	ND	ND	ND
SB7-2-5.5	5/20/99	88448	69 (J)	120 (J)	530	480	610	190 (J)	560	160 (J)	750	80 (J)	ND	ND	ND	ND
SB7-2-7.5	5/20/99	88449	85 (J)	100 (J)	220 (J)	170 (J)	200 (J)	160 (J)	120 (J)	47 (J)	280 (J)	58 (J)	ND	ND	ND	ND
SB7-3-3.5	5/20/99	88434	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-3-5.5	5/20/99	88435	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-3-5.5*	5/20/99	88436	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-3-7.5	5/20/99	88437	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-3.5	5/20/99	88438	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-5.5	5/20/99	88439	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-7.5	5/20/99	88440	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-3.5	5/21/99	88587	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-5.5	5/21/99	88588	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-7.5	5/21/99	88589	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-6-1.5	5/21/99	88590	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-6-3.5	5/21/99	88591	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-6-5.5	5/21/99	88592	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-7-1.5	5/21/99	88593	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-7-5.5	5/21/99	88594	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-7-7.5	5/21/99	88595	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-8-3	5/21/99	88597	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-8-5.5	5/21/99	88598	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-8-5.5*	5/21/99	88599	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-1.5	5/24/99	88645	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-3.5	5/24/99	88646	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-5.5	5/24/99	88647	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-4.0	5/24/99	88648	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-5.5	5/24/99	88649	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-5.5*	5/24/99	88650	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-7.0	5/24/99	88651	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-11-1.5	5/24/99	88652	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-11-3.5	5/24/99	88653	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-11-5.5	5/24/99	88654	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-3.5	5/23/99	88641	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-5.5	5/23/99	88642	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-7.5	5/23/99	88643	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-7.5*	5/23/99	88644	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	210,000	1,050,000	200	200	200	140,000	200	180	480	14,000	60,000	60,000	7,500	11,000

TABLE 5-17

Semivolatile Organic Compounds Detected in Site 7 - POL Storage Area Soil

152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram										
Location Identifier	Date Sampled	Laboratory Number	Dibenzo (a,h) anthracene	Fluorene	Fluoranthene	Indeno (1,2,3-cd) pyrene	2-Methyl-naphthalene	4-Methylphenol	Naphthalene	Phenanthrene	Pyrene	1,2,4- Trichloro-benzene	bis(2 - Ethylhexyl) phathalate
SB7-1-3.5	5/20/99	88443	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-1-5.5	5/20/99	88444	ND	480	110 (J)	85 (J)	1400	ND	740	540	680	ND	ND
SB7-1-7.5	5/20/99	88445	ND	51 (J)	ND	ND	140 (J)	ND	ND	64 (J)	72 (J)	ND	ND
SB7-2-3.5	5/20/99	88446	ND	760	68 (J)	150 (J)	810	ND	300 (J)	710	970	ND	ND
SB7-2-3.5*	5/20/99	88447	890	6,200	280	2,300	110	ND	110 (J)	5,900	9,900 (D)	ND	ND
SB7-2-5.5	5/20/99	88448	70 (J)	1,100	79 (J)	240 (J)	1,500	ND	740	770	1,400	ND	50 (J)
SB7-2-7.5	5/20/99	88449	ND	550	84 (J)	150 (J)	1,700	ND	900	520	630	ND	ND
SB7-3-3.5	5/20/99	88434	ND	ND	ND	ND	1,940	ND	974	ND	ND	ND	ND
SB7-3-5.5	5/20/99	88435	ND	ND	ND	ND	1,010	ND	ND	ND	ND	ND	ND
SB7-3-5.5*	5/20/99	88436	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-3-7.5	5/20/99	88437	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-3.5	5/20/99	88438	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-5.5	5/20/99	88439	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-4-7.5	5/20/99	88440	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-3.5	5/21/99	88587	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-5.5	5/21/99	88588	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-5-7.5	5/21/99	88589	ND	ND	ND	ND	553	ND	ND	ND	ND	ND	ND
SB7-6-1.5	5/21/99	88590	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-6-3.5	5/21/99	88591	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-6-5.5	5/21/99	88592	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-7-1.5	5/21/99	88593	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-7-5.5	5/21/99	88594	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-7-7.5	5/21/99	88595	ND	ND	ND	ND	679	ND	ND	ND	ND	ND	ND
SB7-8-3	5/21/99	88597	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-8-5.5	5/21/99	88598	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-8-5.5*	5/21/99	88599	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-1.5	5/24/99	88645	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-3.5	5/24/99	88646	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-9-5.5	5/24/99	88647	ND	587	ND	ND	ND	ND	ND	ND	646	ND	ND
SB7-10-4.0	5/24/99	88648	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-5.5	5/24/99	88649	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-5.5*	5/24/99	88650	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-10-7.0	5/24/99	88651	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-11-1.5	5/24/99	88652	ND	ND	ND	ND	4290	ND	1540	ND	ND	ND	ND
SB7-11-3.5	5/24/99	88653	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-11-5.5	5/24/99	88654	ND	ND	ND	ND	1260	ND	556	ND	ND	ND	ND
SB7-12-3.5	5/23/99	88641	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-5.5	5/23/99	88642	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-7.5	5/23/99	88643	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB7-12-7.5*	5/23/99	88644	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	200	140,000	140,000	200	140,000	200,000	140,000	140,000	110,000	7,000	600

* = duplicate

ND = not detected

TABLE 5-13

Total Petroleum Hydrocarbons Detected in Site 7 - POL Storage Area Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB7-1-3.5	05/19/95	88443	7.6
SB7-1-5.5	05/19/95	88444	1,000
SB7-1-7.5	05/19/95	88445	24
SB7-2-3.5	05/19/95	88446	560
SB7-2-3.5*	05/19/95	88447	210
SB7-2-5.5	05/19/95	88448	380
SB7-2-7.5	05/19/95	88449	440
SB7-3-3.5	05/19/95	88434	222
SB7-3-5.5	05/19/95	88435	184
SB7-3-5.5*	05/19/95	88436	141
SB7-3-7.5	05/19/95	88437	10.8
SB7-4-3.5	05/19/95	88438	ND
SB7-4-5.5	05/19/95	88439	ND
SB7-4-7.5	05/19/95	88440	ND
SB7-5-3.5	05/20/95	88587	ND
SB7-5-5.5	05/20/95	88588	306
SB7-5-7.5	05/20/95	88589	1,010
SB7-6-1.5	05/20/95	88590	ND
SB7-6-3.5	05/20/95	88591	4.31
SB7-6-5.5	05/20/95	88592	ND
SB7-7-1.5	05/20/95	88593	5,520
SB7-7-5.5	05/20/95	88594	144
SB7-7-7.5	05/20/95	88595	93
		Cleanup Level	210

TABLE 5-18

Total Petroleum Hydrocarbons Detected in Site 7 - POL Storage Area Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB7-8-3	05/20/95	88597	ND
SB7-8-5.5	05/20/95	88598	ND
SB7-8-5.5*	05/20/95	88599	ND
SB7-9-1.5	05/23/95	88645	3.58
SB7-9-3.5	05/23/95	88646	ND
SB7-9-5.5	05/23/95	88647	ND
SB7-10-4.0	05/23/95	88648	ND
SB7-10-5.5	05/23/95	88649	110
SB7-10-5.5*	05/23/95	88650	107
SB7-10-7.0	05/23/95	88651	170
SB7-11-1.5	05/23/95	88652	765
SB7-11.3.5	05/23/95	88653	70
SB7-11-5.5	05/23/95	88654	908
SB7-12-3.5	05/22/95	88641	ND
SB7-12-5.5	05/22/95	88642	ND
SB7-12-7.5	05/22/95	88643	ND
SB7-12-7.5*	05/22/95	88644	ND
		Cleanup Level	210

* = duplicate
mg/kg = milligrams per kilograms
TPH = total petroleum hydrocarbons
ND = not detected

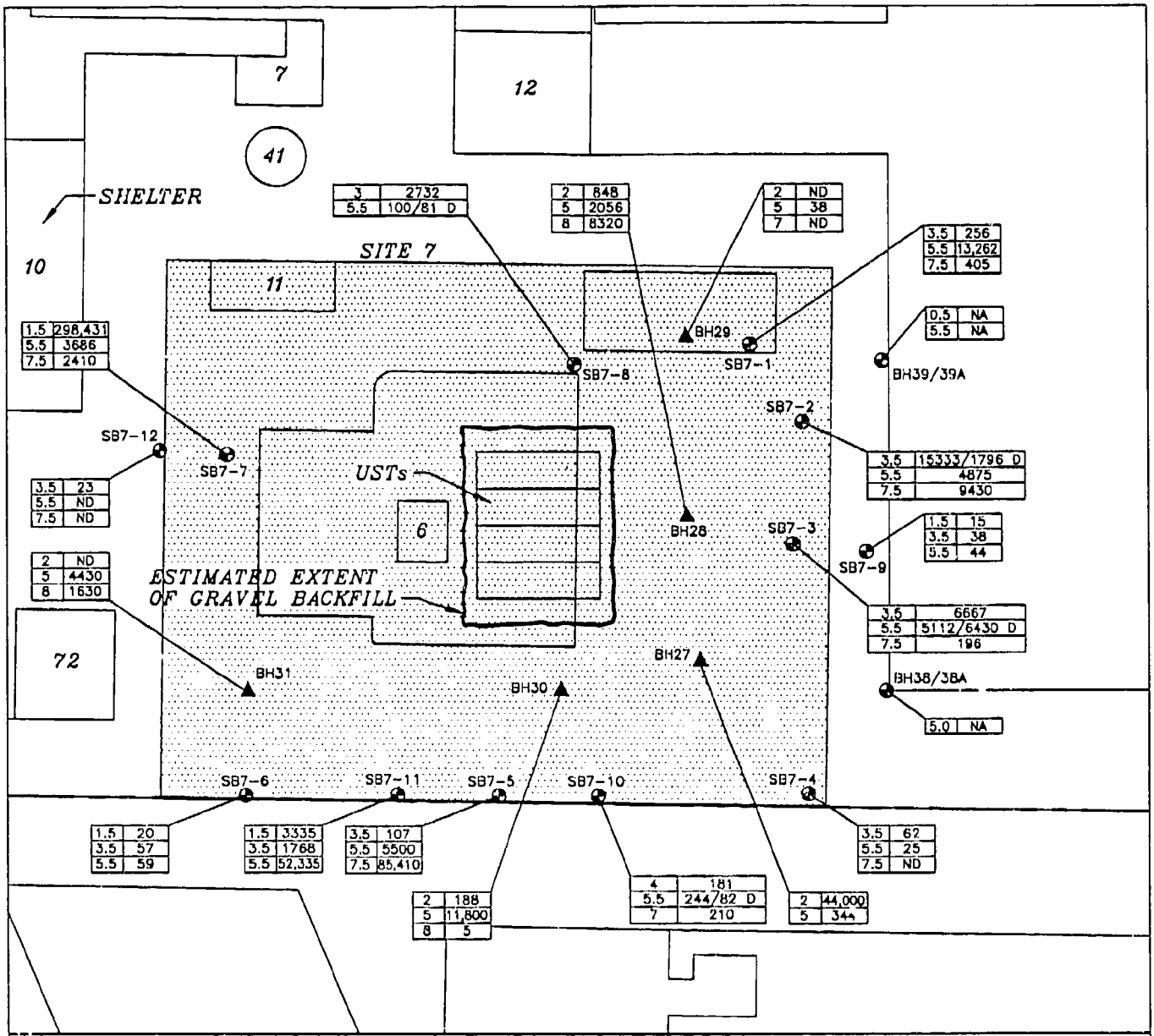


FIGURE 5-23

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IRP SITE 7 – POL STORAGE AREA, TOTAL VOLATILE ORGANIC COMPOUNDS IN SOIL

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

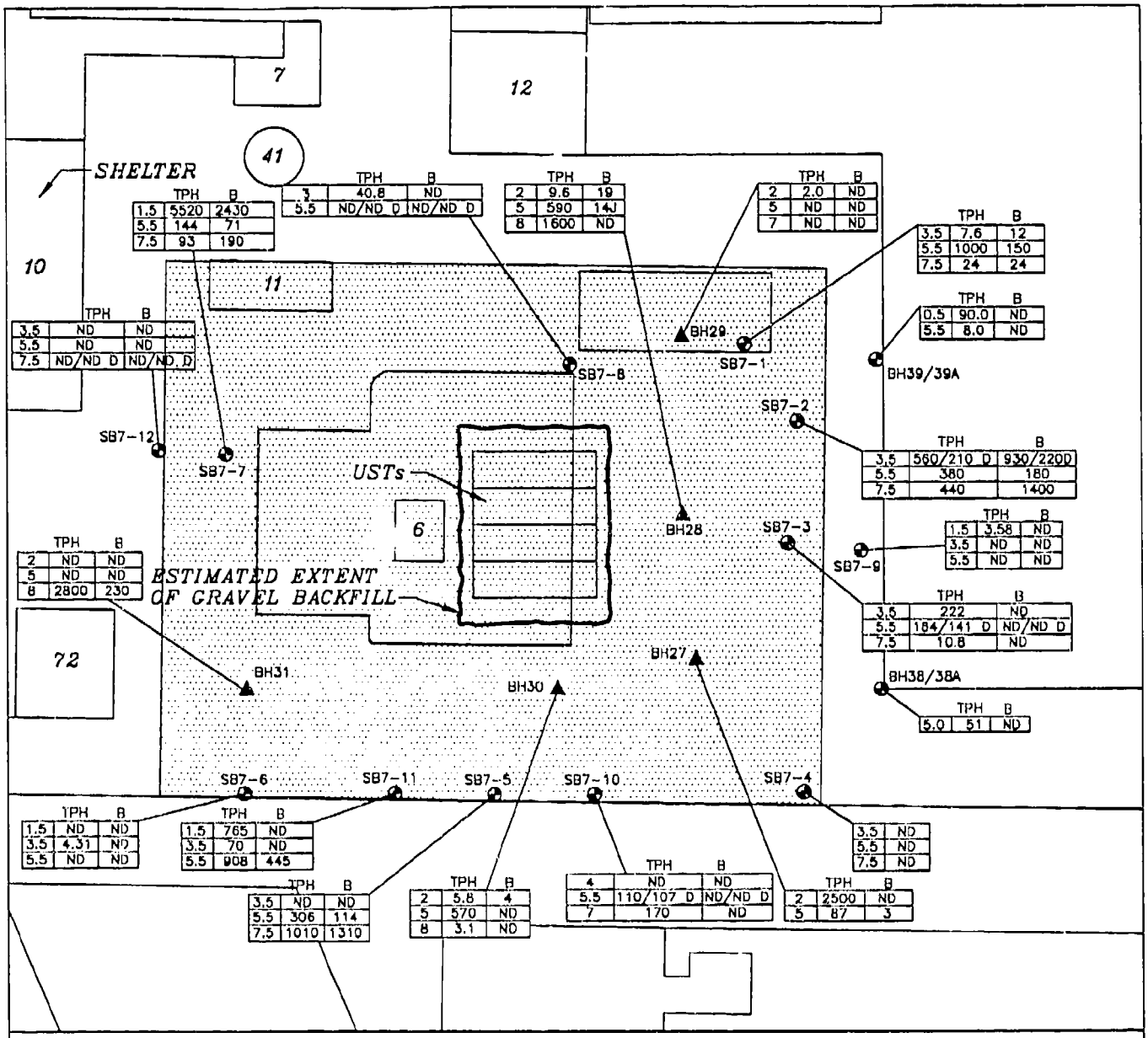


FIGURE 5-24

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IRP SITE 7 – POL STORAGE AREA, TOTAL PETROLEUM HYDROCARBONS AND BENZENE IN SOIL

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

SB7-9, and SB7-11. The following SVOCs were detected in one or more soil samples collected from these soil borings: 2-methylnaphthalene (110 to 4,290 µg/kg), acenaphthene (69 to 190 µg/kg), anthracene (100 to 840 µg/kg), benzo(a)anthracene (220 to 2,800 µg/kg), benzo(a)pyrene (120 to 2,400 µg/kg), benzo(b)fluoranthene (100 to 3,300 µg/kg), benzo(g,h,i)perylene (52 to 2,000), bis(2-ethylhexyl)phthalate (50 µg/kg), carbazole (47 to 940 µg/kg), chrysene (240 to 3,900 µg/kg), dibenzo(a,h)anthracene (70 to 890 µg/kg), dibenzofuran (54 to 300 µg/kg), fluorene (68 to 6,200), fluoranthene (51 to 280 µg/kg), indeno(1,2,3-cd)pyrene (65 to 2,300 µg/kg), naphthalene (110 to 1,540 µg/kg), phenanthrene (64 to 5,900 µg/kg), pyrene (72 to 9,900 µg/kg). In general, the highest SVOC concentrations in Site 7 - POL Storage Area soil samples were detected in duplicate soil sample SB7-2-3.5 (Table 5-17 and Figure 5-25). Figures 5-26A and 5-26B show the areal and vertical distribution of selected SVOCs in soils.

5.5.3.3 Total Petroleum Hydrocarbons. TPH were detected in soil samples collected from soil borings SB7-1 through SB7-3 and SB7-5 through SB7-11 at concentrations ranging from 3.58 to 5,520 mg/kg (Table 5-18 and Figure 5-25).

5.5.4 Ground Water Investigation Results

Ground water samples were collected from Site 7 - POL Storage Area in May 1995 from monitoring wells MW06, MW07, MW10, MW23, MW24, MW25, and MW31. Monitoring well MW24 was resampled in July 1995 for VOC analysis due to quality control problems encountered by the analytical laboratory. Monitoring well MW31 was also scheduled for resampling but was inadvertently omitted from the July 1995 monitoring event. For the purpose of this RI Report, the analytical data for the July 1995 sampling event supersede the VOC analysis of the original RI samples collected in May 1995. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995.

Ground water sampling and screening procedures are described in detail in Section 4.4. Table 5-15 summarizes the ground water sampling program for chemical analysis.

Complete analytical results for ground water samples collected from monitoring wells at Site 7 - POL Storage Area are available at the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analyses are presented in Tables 5-19 through 5-21. Section 2.3.3 presents a summary of ground water chemical quality data collected from Site 7 - POL Storage Area monitoring wells prior to the RI.

TABLE 5-19

Volatile Organic Compounds Detected in Site 7 - POL Storage Area Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per liter														
Location Identifier	Date Sampled	Laboratory Number	Chlorobenzene	Chloroform	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Methylene Chloride	TCE	Benzene	Ethylbenzene	Toluene	m-Xylene	o-Xylene	p-Xylene	Total Xylenes	1,1-Dichloroethane
MW06	5/13/95	88090	ND	ND	ND	ND	ND	ND	ND	15	9	ND	ND	ND	ND	ND	ND
MW06*	5/13/95	88091	ND	ND	ND	ND	ND	ND	ND	25	18	ND	ND	3	13	–	ND
MW06	8/24/95	114203-0003-SA	ND	ND	ND	ND	ND	ND	ND	16	17	ND	–	–	–	21	ND
MW06	11/16/95	115947-0004-SA	ND	ND	ND	ND	ND	ND	ND	17	18	ND	–	–	–	32	ND
MW07	5/13/95	88093	ND	ND	ND	ND	ND	ND	ND	85	140	11	ND	39	67	–	ND
MW07	8/24/95	114203-0007-SA	ND	ND	ND	ND	ND	ND	ND	470	260	ND	–	–	–	410	ND
MW07	11/26/95	115947-0007-SA	ND	ND	ND	ND	ND	ND	ND	20	14	ND	–	–	–	30	1.2
MW10	5/14/95	88124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW10	8/23/95	114163-0006-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW10	11/16/95	115947-0003-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW23	5/14/95	88126	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW23	8/22/95	114124-0008-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW23	11/15/95	115954-0013-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW24	7/13/95	91088	ND	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW24	8/22/95	114124-0004-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW24	11/15/95	115954-0012-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW25	5/13/95	88092	ND	ND	ND	ND	ND	ND	ND	1,200	19	9	ND	28	175	–	ND
MW25	8/25/95	114231-0001-SA	ND	ND	ND	ND	ND	ND	ND	1,000	ND	ND	–	–	–	[illegible]	
MW25	11/17/95	116019-0002-SA	ND	ND	ND	ND	ND	ND	ND	1,300	ND	ND	–	–	–	4	[illegible]
MW31	8/24/95	114203-0005-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW31*	8/24/95	114203-0005-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
MW31	11/16/95	115947-0008-SA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	ND	ND
T-4	8/25/95	114231-0003-SA	ND	ND	ND	ND	ND	ND	ND	260	ND	460	–	–	–	400	ND
T-4*	8/25/95	114231-0004-SA	ND	ND	ND	ND	ND	ND	ND	1,200	370	2,000	–	–	–	1,500	ND
T-4	11/17/95	116019-0003-SA	ND	ND	ND	ND	ND	ND	ND	10	9.9	7.6	–	–	–	50	ND
		MCL	100	80	600	600	75	5	5	5	700	1,000	NA	NA	NA	10,000	NA
		Cleanup Level	100	NA	600	600	75	NA	5	5	700	1,000	NA	NA	NA	10,000	NA

* = duplicate
ND = not detected
TCE = trichloroethylene
– = not reported
MCL = maximum contaminant level
NA = not available

TABLE 5-20

Semivolatile Organic Compounds Detected in Site 7 - POL Storage Area Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per liter						
Location Identifier	Date Sampled	Laboratory Number	1,2-Dichlorobenzene	2,4-Dimethyl-phenol	2-Methyl-naphthalene	Phenanthrene	Naphthalene	bis (2-Ethylhexyl)-phthalate	Di-n-octyl phthalate
MW06	05/13/95	88090	ND	ND	ND	ND	ND	ND	ND
MW06*	05/13/95	88091	ND	ND	ND	ND	ND	ND	ND
MW06	08/24/95	114200-0003-SA	ND	ND	ND	ND	ND	ND	ND
MW06	11/16/95	115997-0009-SA	ND	ND	ND	ND	ND	15	ND
MW07	05/13/95	88093	ND	ND	18	ND	22	19	ND
MW07	08/24/95	114200-0007-SA	ND	ND	ND	ND	13	15	ND
MW07	11/26/95	115997-0007-SA	ND	ND	19	ND	15	32	ND
MW10	05/14/95	88124	ND	ND	ND	ND	ND	ND	ND
MW10	08/23/95	114163-0006-SA	ND	ND	ND	ND	ND	ND	ND
MW10	11/16/95	115997-0003-SA	ND	ND	ND	ND	ND	ND	ND
MW23	05/14/95	88126	ND	ND	ND	ND	ND	ND	ND
MW23	08/22/95	114124-0008-SA	ND	ND	ND	ND	ND	ND	ND
MW23	11/15/95	115954-0013-SA	ND	ND	ND	ND	ND	ND	ND
MW24	05/25/95	88873	ND	ND	ND	ND	ND	ND	ND
MW24	08/22/95	114124-0004-SA	ND	ND	ND	ND	ND	ND	ND
MW24	11/15/95	115954-0012-SA	ND	ND	ND	ND	ND	ND	ND
MW25	05/13/95	88092	ND	11	19	ND	22	14	ND
MW25	08/25/95	114231-0001-SA	ND	ND	40	10	34	44	ND
MW25	11/17/95	116019-0002-SA	ND	12	28	ND	24	60	ND
MW31	05/25/95	88870	ND	ND	ND	ND	ND	ND	ND
MW31	08/24/95	114200-0005-SA	ND	ND	ND	ND	ND	ND	ND
MW31*	08/24/95	114200-0006-SA	ND	ND	ND	ND	ND	ND	ND
MW31	11/16/95	115997-0008-SA	ND	ND	ND	ND	ND	ND	ND
T-4	08/25/95	114231-0003-SA	ND	ND	59	ND	48	1,600	33
T-4*	08/25/95	114231-0004-SA	ND	ND	63	ND	53	1,700	36
T-4	11/17/95	116019-0003-SA	ND	ND	ND	ND	ND	500	ND
		MCL	600	NA	NA	NA	NA	6	NA
		Cleanup Level	600	700	1,400	1,400	1,400	6	700

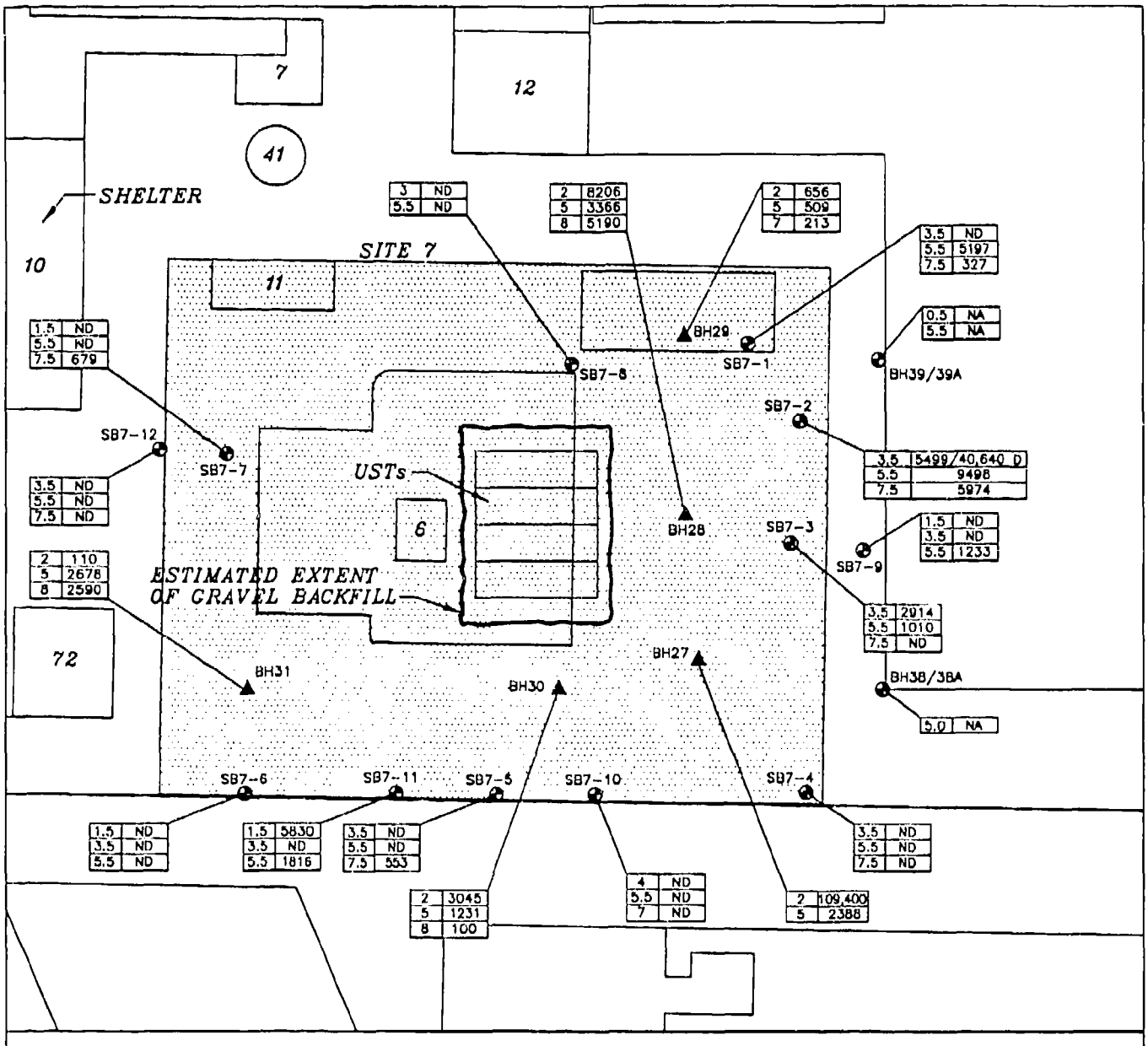
* = duplicate
ND = not detected
(--) = not reported
MCL = maximum contaminant level
NA = not available

TABLE 5-21

Total Petroleum Hydrocarbons Detected in Site 7 - POL Storage Area Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, µg/l
MW06	5/13/95	88090	ND
MW06*	5/13/95	88091	ND
MW06	8/24/95	114200-0003-SA	7,500
MW06	11/16/95	115997-0009-SA	11,000
MW07	5/13/95	88093	1,340
MW07	8/24/95	114200-0007-SA	38,000
MW07	11/26/95	115997-0007-SA	21,000
MW10	5/14/95	88124	ND
MW10	8/23/95	114163-0006-SA	ND
MW10	11/16/95	115997-0003-SA	ND
MW23	5/14/95	88126	433
MW23	8/22/95	114124-0008-SA	ND
MW23	11/15/95	115954-0013-SA	ND
MW24	5/25/95	88873	ND
MW24	8/22/95	114124-0004-SA	ND
MW24	11/15/95	115954-0012-SA	ND
MW25	5/13/95	88092	4,490
MW25	8/25/95	114231-0001-SA	17,000
MW25	11/17/95	116019-0002-SA	28,000
MW31	5/25/95	88870	ND
MW31	8/24/95	114200-0005-SA	930
MW31*	8/24/95	114200-0006-SA	730
MW31	11/16/95	115997-0008-SA	770
T-4	8/25/95	114231-0003-SA	75,000
T-4*	8/25/95	114231-0004-SA	46,000
T-4	11/17/95	116019-0003-SA	6,700

* = duplicate
TPH = total petroleum hydrocarbons
µg/l = micrograms per liter
ND = not detected



EXPLANATION

DEPTH, FEET BELOW GROUND LEVEL

3.5	5499/40,640 D
5.5	9498
7.5	5974

CONCENTRATION IN MICROGRAMS PER KILOGRAM

NA DATA NOT AVAILABLE

ND NOT DETECTED

D FIELD DUPLICATE

ORIGINAL IRP SITE

BASE BOUNDARY

SB7-4 SOIL BORING – REMEDIAL INVESTIGATION

BH27 SOIL BORING – SITE INVESTIGATION

FIGURE 5-25

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IRP SITE 7 – POL STORAGE AREA, TOTAL SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

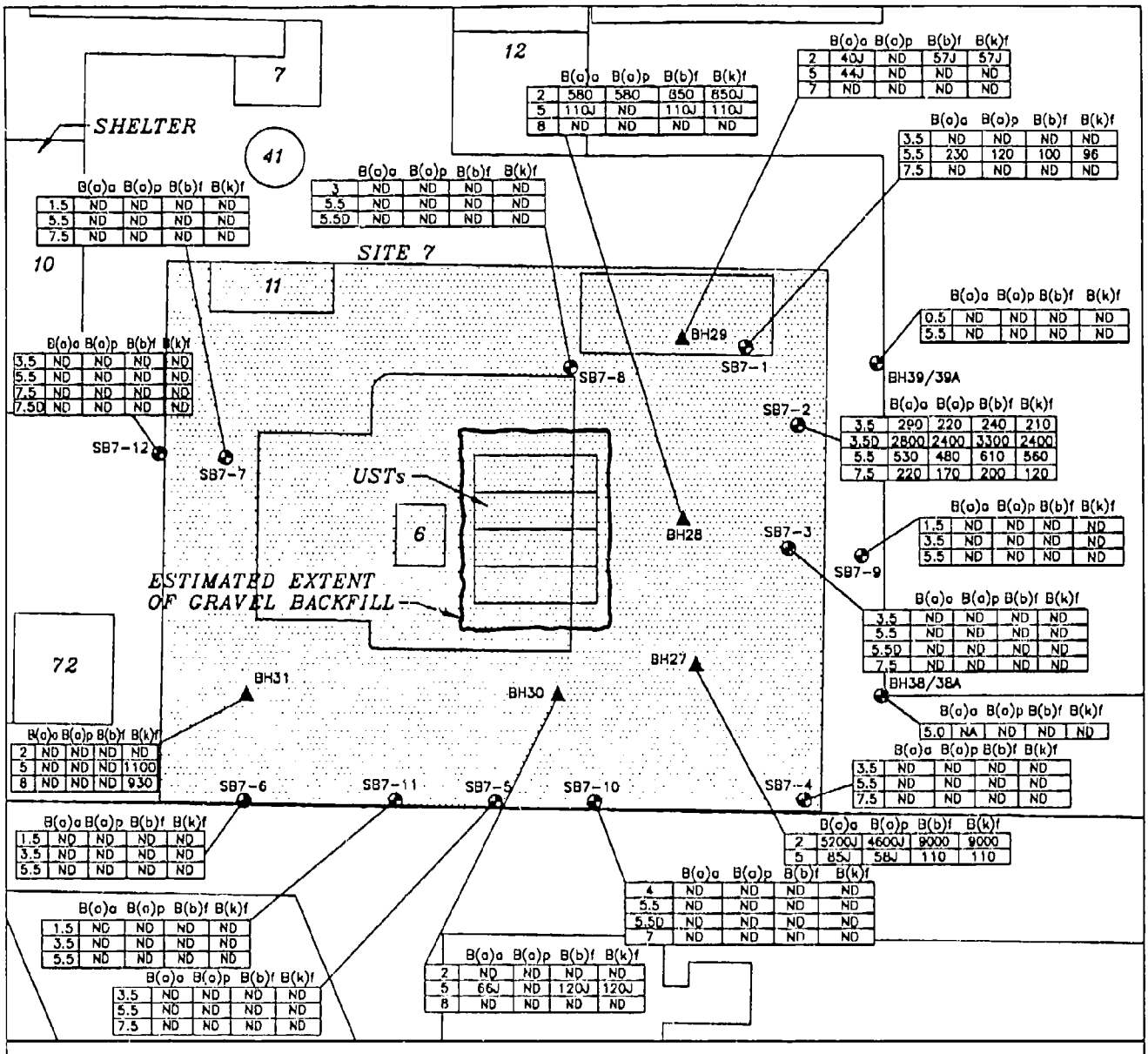


FIGURE 5-26A

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IRP SITE 7 - POL STORAGE AREA, SELECTED SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

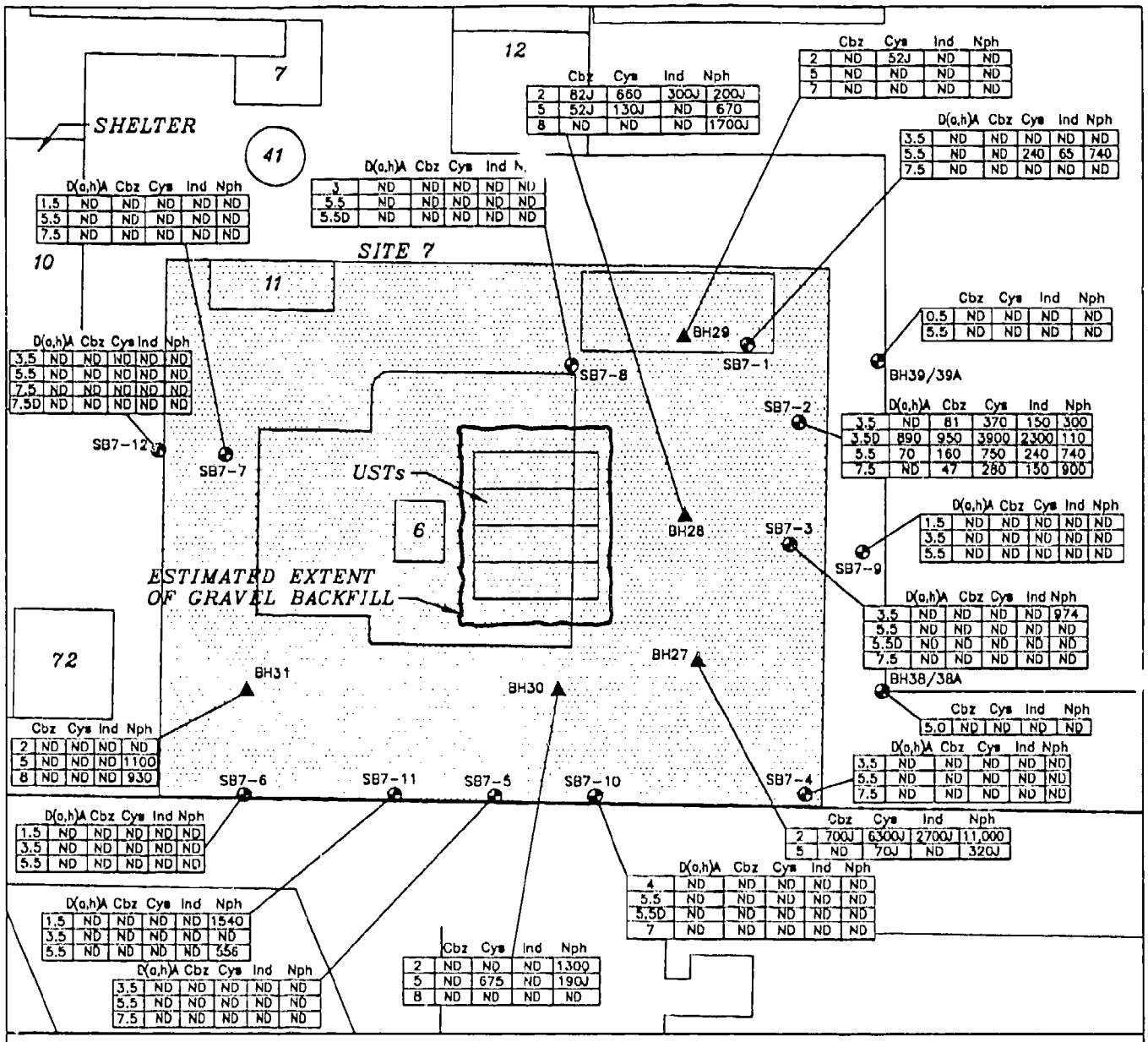


FIGURE 5-26B

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IRP SITE 7 - POL STORAGE AREA, SELECTED SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

5.5.4.1 Volatile Organic Compounds. Several VOCs were detected in RI ground water samples collected from monitoring wells MW06, MW07, MW25, and product monitoring well T-4: benzene (15 to 1,300 µg/l), ethylbenzene (9 to 370 µg/l), toluene (9 to 2,000 µg/l), total xylenes (16 to 1,500 µg/l), 1,1-Dicloroethane (1.2 µg/l), (Table 5-19). Figure 5-27 shows the distribution of benzene and toluene in Site 7 - POL Storage Area ground water. Methylene chloride was detected in ground water samples collected from monitoring wells MW24 and MW31. Detection of this compound is considered indicative of laboratory contamination.

5.5.4.2 Semivolatile Organic Compounds. SVOCs were detected in RI ground water samples collected from monitoring wells MW07 and MW25: 2,4-dimethylphenol (12 µg/l), 2-methylnaphthalene (18 to 63 µg/l), bis(2-ethylhexyl)phthalate (14 to 1,700 µg/l), and naphthalene (22 to 53 µg/l), (Table 5-20). Figure 5-27 shows the distribution of bis(2-ethylhexyl)phthalate in Site 7 - POL Storage Area ground water.

5.5.4.3 Total Petroleum Hydrocarbons and Lead. TPH were detected in RI ground water samples collected from monitoring wells MW07, MW23, MW25, and product recovery well T-4 at concentrations ranging from 433 to 75,000 µg/l (Table 5-21). Lead was not detected in RI ground water samples.

5.5.4.4 RI Product Thickness and Characterization. Floating product thickness was measured in Site 7 - POL Storage Area wells during RI field activities. Figure 5-28 presents the locations at which floating product was detected and thickness of product encountered during late May 1995, August 1995, and November 1995. Product thickness was measured using an interface probe. Approximately 6 feet of floating product was measured in product monitoring well T-1 and product recovery well T-3 that were completed in the excavation backfill. ERM estimates that approximately 13,500 gallons of floating product existed within the UST excavation area as of mid-August 1995. This estimate was based on data collected during product removal operations in late August 1995, described in Section 5.5.4.5.

Approximately 0.1 foot (1.2 inches) of floating product was also measured in monitoring well T-2, located approximately 15 feet east of the surface extent of gravel backfill in the UST excavation. Approximately 0.07 foot (0.8 inches) of floating product was also measured in product monitoring well T-3, located approximately 70 feet south of the surface extent of gravel backfill.

Product samples were collected in May 1995 from product monitoring well T-4 and product recovery well T-3. Visual examination of both samples indicated that product was highly weathered in appearance. The samples were submitted for fuel fingerprint analysis using EPA

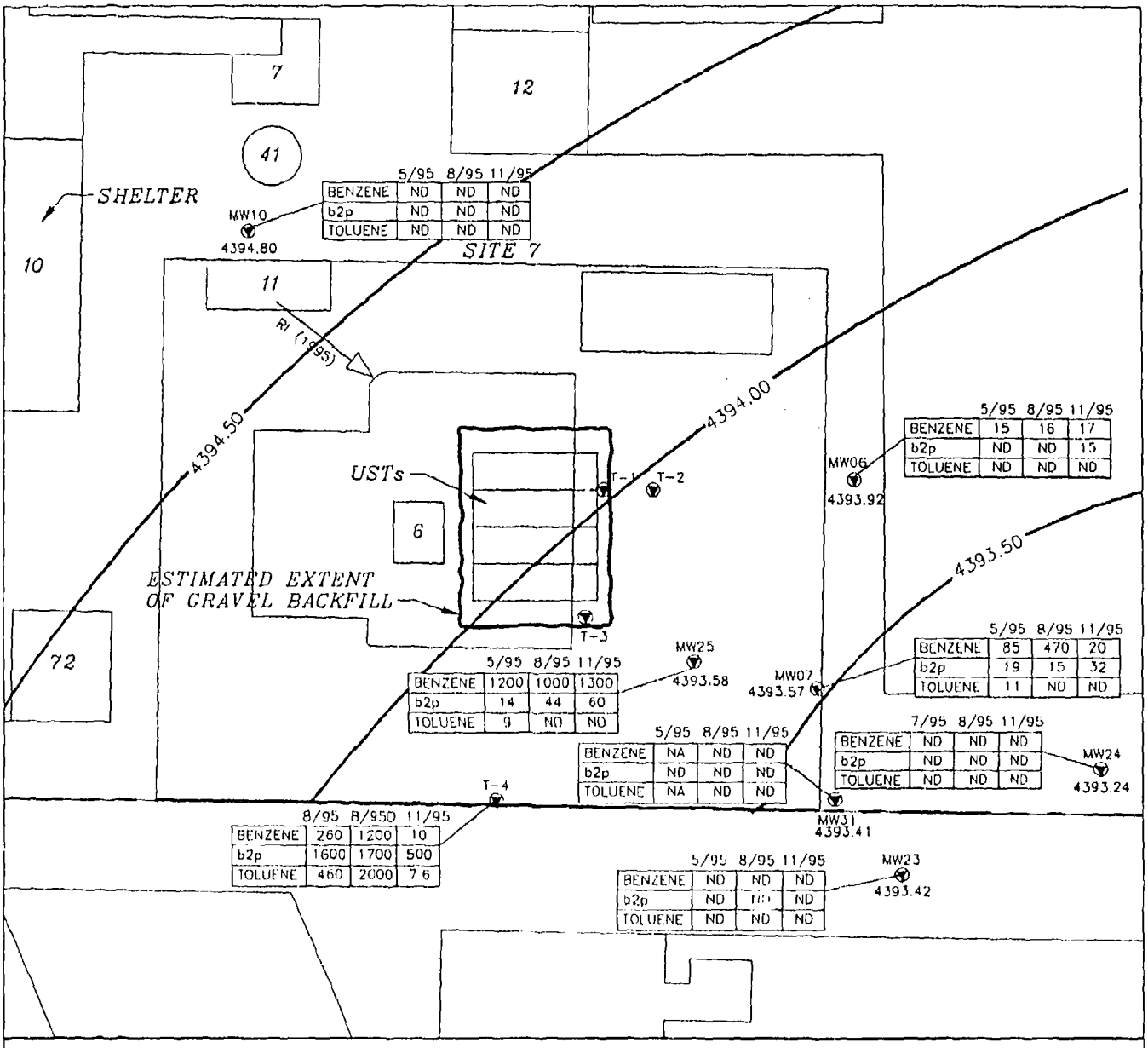


FIGURE 5-27

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IRP SITE 7 – POL STORAGE AREA, SELECTED ORGANIC COMPOUNDS IN GROUND WATER

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

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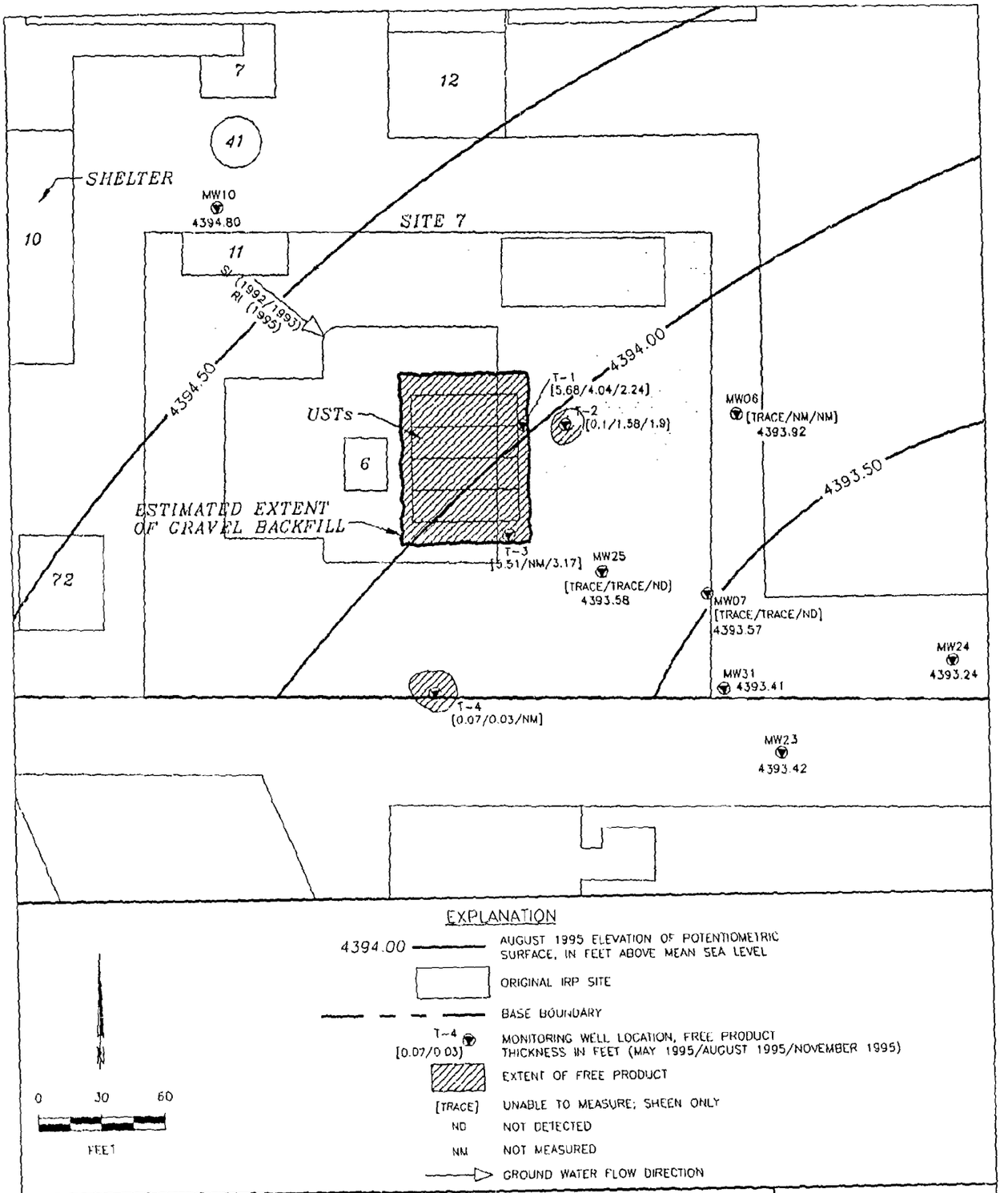


FIGURE 5-28

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IRP SITE 7 – POL STORAGE AREA, EXTENT OF FREE PRODUCT

152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

Method 3510/8000. The results of the analysis suggested that both samples were comprised of weathered JP-4 fuel.

5.5.4.5 Product Removal Operations. A product recovery program was initiated at Site 7 - POL Storage Area after the discovery of 6 feet of free product in the gravel backfill in the UST excavation. The thickness of free product encountered during RI field work was more than anticipated based on review of previous data at the site. ANG/CEVR contracted with ERM to conduct a product removal program to supplement the existing product removal system previously installed at recovery well T-3 in June 1995.

Three additional product recovery wells (T-5 through T-7) were installed in the gravel backfill area (Figure 4-3) on August 21 and 22, 1995. Product recovery operations, comprised of a vacuum pump attached to a tank truck, were used to extract free product from the additional recovery wells. Product removal operations continued during a 10-day period during August 23 and September 7, 1995. During this period, approximately 10,000 gallons of product were removed from the gravel backfill. The observed product thickness in recovery well T-5 decreased from 2.73 to 0.60 feet; product thickness in recovery well T-6 decreased from 5.3 to 1.1 feet; and product thickness in recovery well T-7 decreased from 5.3 to 1.5 feet. A comparison of product recovery data for recovery wells T-6 and T-7 with the quantity of product removed suggests that 1 foot of product thickness in the gravel backfill is roughly equivalent to 2,500 gallons of free product.

ERM prepared a letter report outlining the details of the recovery well installation and product recovery program. This report is included in Appendix A.

5.5.5 Conclusions

5.5.5.1 Floating Product. A significant quantity of floating product was discovered during RI investigations at Site 7 - POL Storage Area. The product is located within the gravel backfill in the UST excavation area. Review of data collected during both the SI and RI suggest geologic conditions surrounding the UST excavation area has minimized the migration of floating product from the excavation. Figure 5-29 presents a conceptual model of floating product distribution in the immediate vicinity of the excavation. The excavation breaches the confining layer at Site 7 - POL Storage Area creating a "window" into the shallow ground water unit at the site.

Based on available product thickness data collected prior to the start of the product removal program, it appears that some of the floating

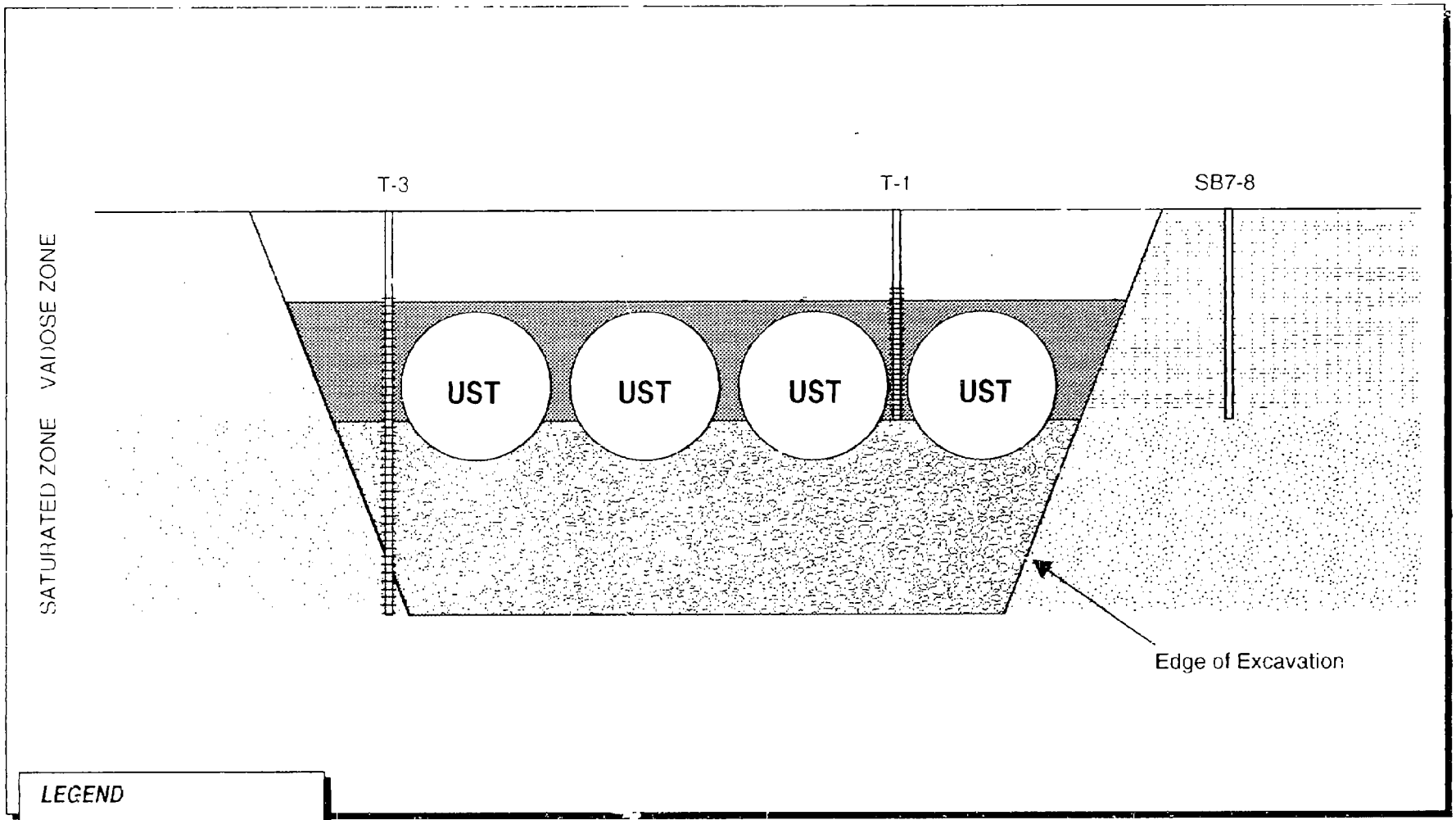


Figure 5-29
Conceptual Model of IRP Site 7-Pol Storage Area
Geological Cross Section
152nd Tactical Reconnaissance Group, NVANG Base
Reno, Nevada

ERM-West, Inc. 7/95

product within the excavation was in direct contact with coarser grained sediments of the shallow ground water zone at Site 7 - POL Storage Area. However, the majority of the floating product was surrounded by the relatively fine-grained soils of the vadose zone. These soils have crea' d impediment to product flow outward from the excavation.

Despite the direct contact between ground water and product, it appears that minimal amounts of floating product have migrated away from the excavation area (Figure 5-28). It is likely that the free product detected at product monitoring well T-2 originates from the UST in the excavation area. Review of SI and RI data also suggests that relatively high concentrations of VOCs and SVOCs associated with dissolved phase product are migrating from the excavation area to downgradient monitoring wells MW25 and MW7.

It is recommended that an FS be performed for free product removal from the excavation backfill in order to remove this source of petroleum hydrocarbons to Site 7 - POL Storage Area ground water.

One additional area of free product exists at Site 7 - POL Storage Area in the vicinity of product monitoring well T-4. This discrete area of floating product is likely associated with surface spill event. The information used to identify this area of free product as associated with a separate spill event is as follows:

- Elevated soil concentrations for TPH were detected in the soils in the vadose zone at the monitoring well T-4 location; and
- No evidence of the presence of free product was detected during the drilling of SI soil boring BH30.

Product thickness measured in product monitoring well T-4 was approximately 0.8 inches in May and June 1994. When converted to actual thickness on the water table using the four-times-less approach (i.e., divide by four), the floating product does not currently exceed the NDEP removal-action guideline of 0.5-inch actual thickness. A periodic product thickness monitoring program and mitigation by bailing should be instituted A similar program was successful in significantly reducing free product thickness at monitoring well MW07.

5.5.5.2 Soil and Ground Water. ERM compar d the results of SI and RI soil and ground water chemical analyses for Site 7 - POL Storage Area to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas

of ground water and soils that may require remediation. The results of the comparison indicated that the following compounds equaled or exceeded cleanup standards in one or more RI and/or SI samples:

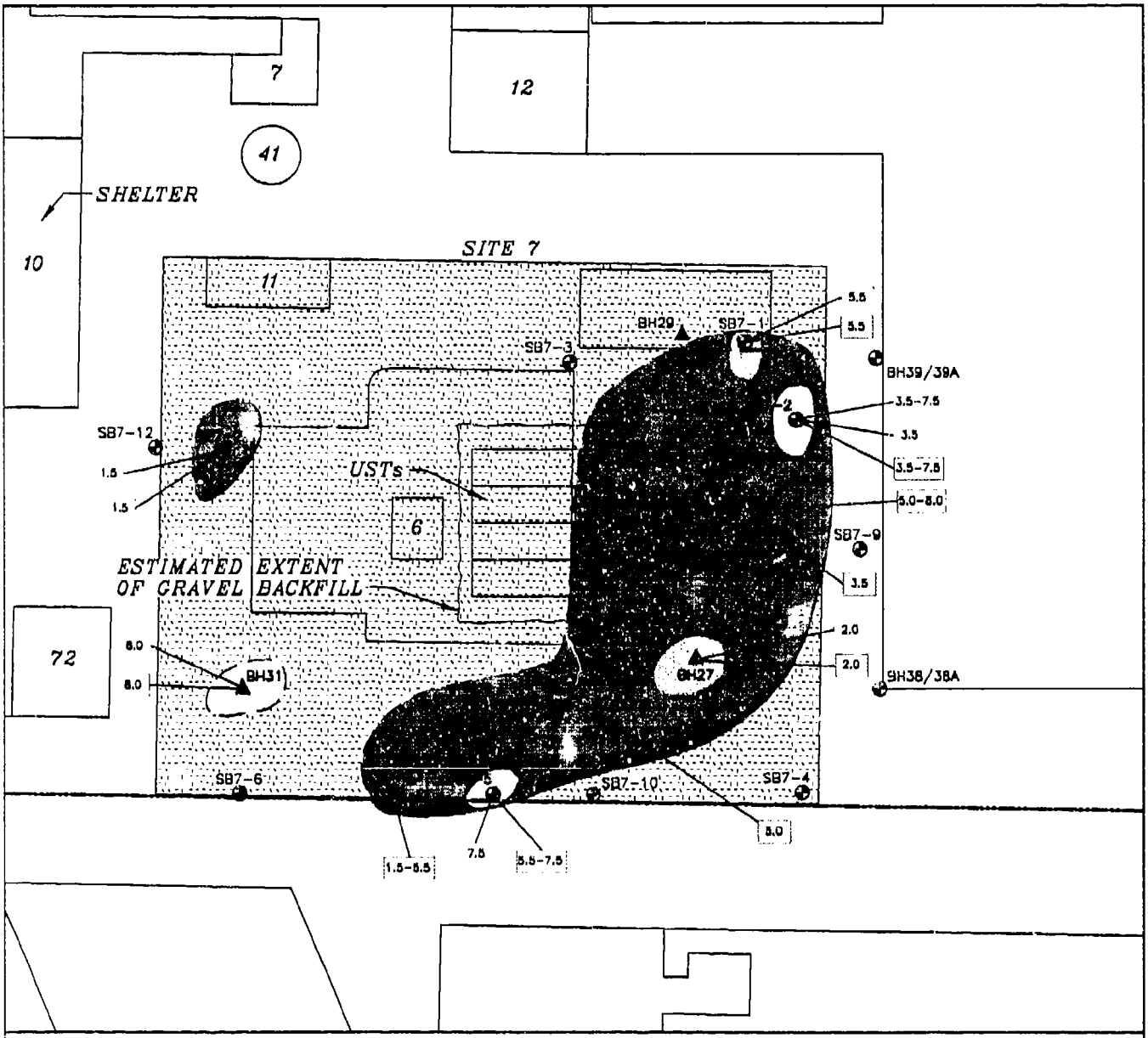
- Ground water: benzene, toluene, and bis(2-ethylhexyl)phthalate; and

- Soil: TPH, benzene, and several PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbozole, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene].

Figure 5-30 depicts the approximate area where soil exceeded cleanup standards. This figure also shows the collection depths of those soil samples in which soils exceeded the respective standards. Review of the areal and vertical distributions of TPH, benzene, and PAHs suggests that these distributions are consistent with the product release history at Site 7 - POL Storage Area (Section 2.3.2.2). Several JP-4 spills have occurred in the Site 7 - POL Storage Area, most of which are reported to have been flushed into soil and gravel areas surrounding the refueling stand. Because the presence of elevated concentrations of petroleum hydrocarbons in Site 7 - POL Storage Area soils poses a threat to ground water quality, it is recommended that a FS be performed.

Figure 5-31 depicts the approximate area where ground water exceeds cleanup standards with respect to benzene, toluene, and bis(2-ethylhexyl)phthalate. The area of ground water impacted by benzene comprises the eastern half of Site 7 - POL Storage Area. This area may actually extend off-Base in the vicinity of the Airport's control tower. However, it is not anticipated that the benzene impacted ground water extends a significant distance south of the Base fence line, based on review of the on-Base benzene distribution.

The approximate area of ground water impacted by bis(2-ethylhexyl)phthalate appears to be confined to the vicinity of monitoring wells MW07, MW25, and product monitoring well T-4 (Figure 5-31). This compound has been historically detected in ground water samples collected from monitoring well MW07 at concentrations exceeding the cleanup standard. Although bis(2-ethylhexyl)phthalate is known as a common laboratory contaminant, no information is available to suggest that laboratory contamination is responsible for detection of this compound in monitoring wells MW07, MW25, and product monitoring well T-4 samples. The approximate area of ground water impacted by toluene appears to be confined in the immediate vicinity of product monitoring well T-4 (Figure 5-31).



EXPLANATION

- BASE BOUNDARY
- SB7-6 — SOIL BORING – REMEDIAL INVESTIGATION
- BH31 — SOIL BORING – SITE INVESTIGATION
- 2.0 — DEPTHS AT WHICH TOTAL PETROLEUM HYDROCARBONS EXCEED REGULATORY LEVELS (FEET BELOW GROUND LEVEL)
- 3.5 — DEPTH AT WHICH POLYNUCLEAR AROMATIC HYDROCARBONS EXCEED REGULATORY LEVELS (FEET BELOW GROUND LEVEL)
- 3.5 — DEPTH AT WHICH BENZENE EXCEEDS REGULATORY LEVELS (FEET BELOW GROUND LEVEL)
- ORIGINAL IRP SITE

0 30 60

FEET

FIGURE 5-30

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AREA OF IRP SITE 7 – POL STORAGE AREA, SOILS EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA

ERM

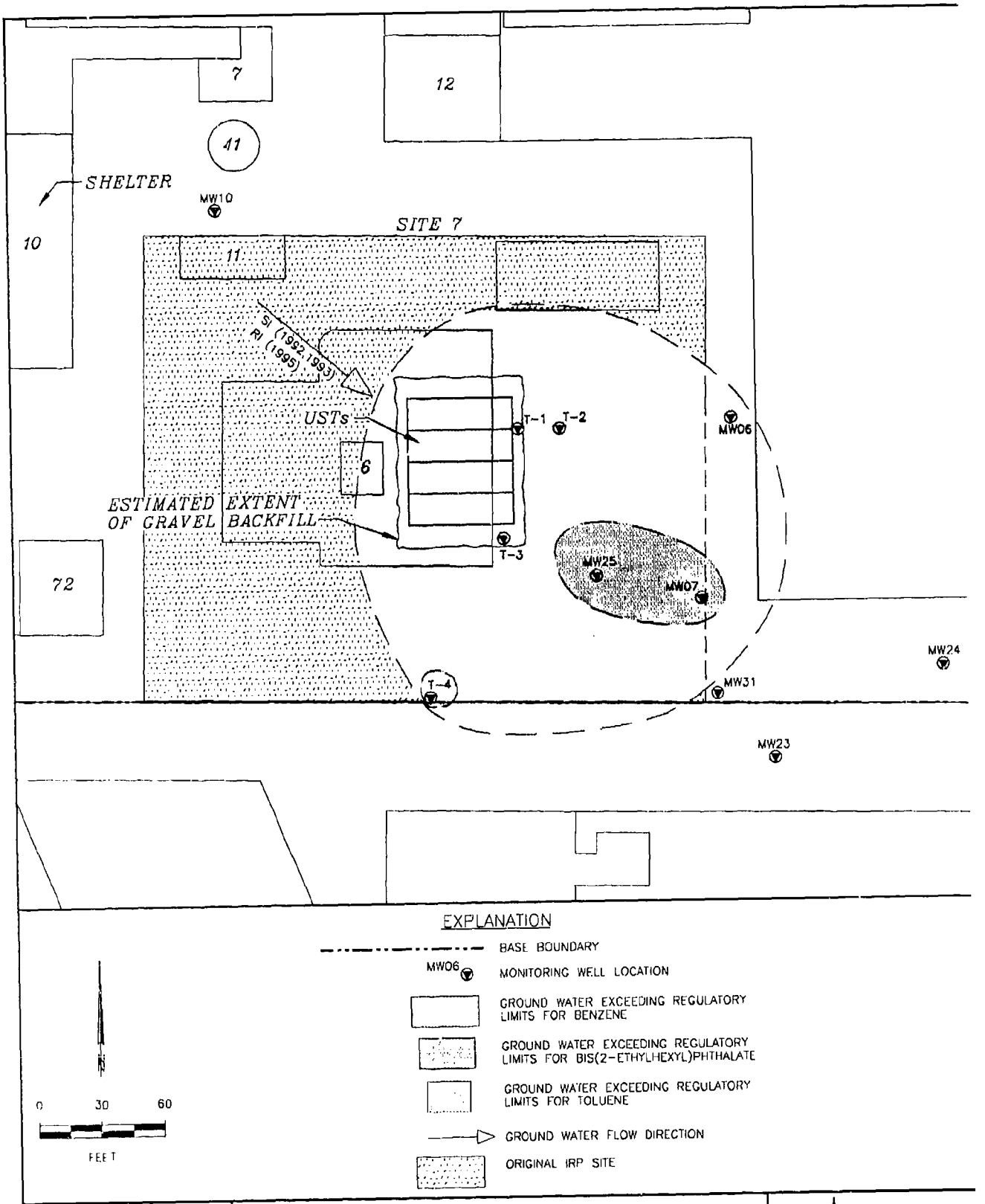


FIGURE 5-31

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AREA OF IRP SITE 7 - POL STORAGE AREA, GROUND WATER EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP, NVANG, RENO, NEVADA

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Based on review of Site 7 - POL Storage Area ground water data, it is recommended that a FS be performed for Site 7 ground water.

5.6 Site 14 - Oil Water Separator

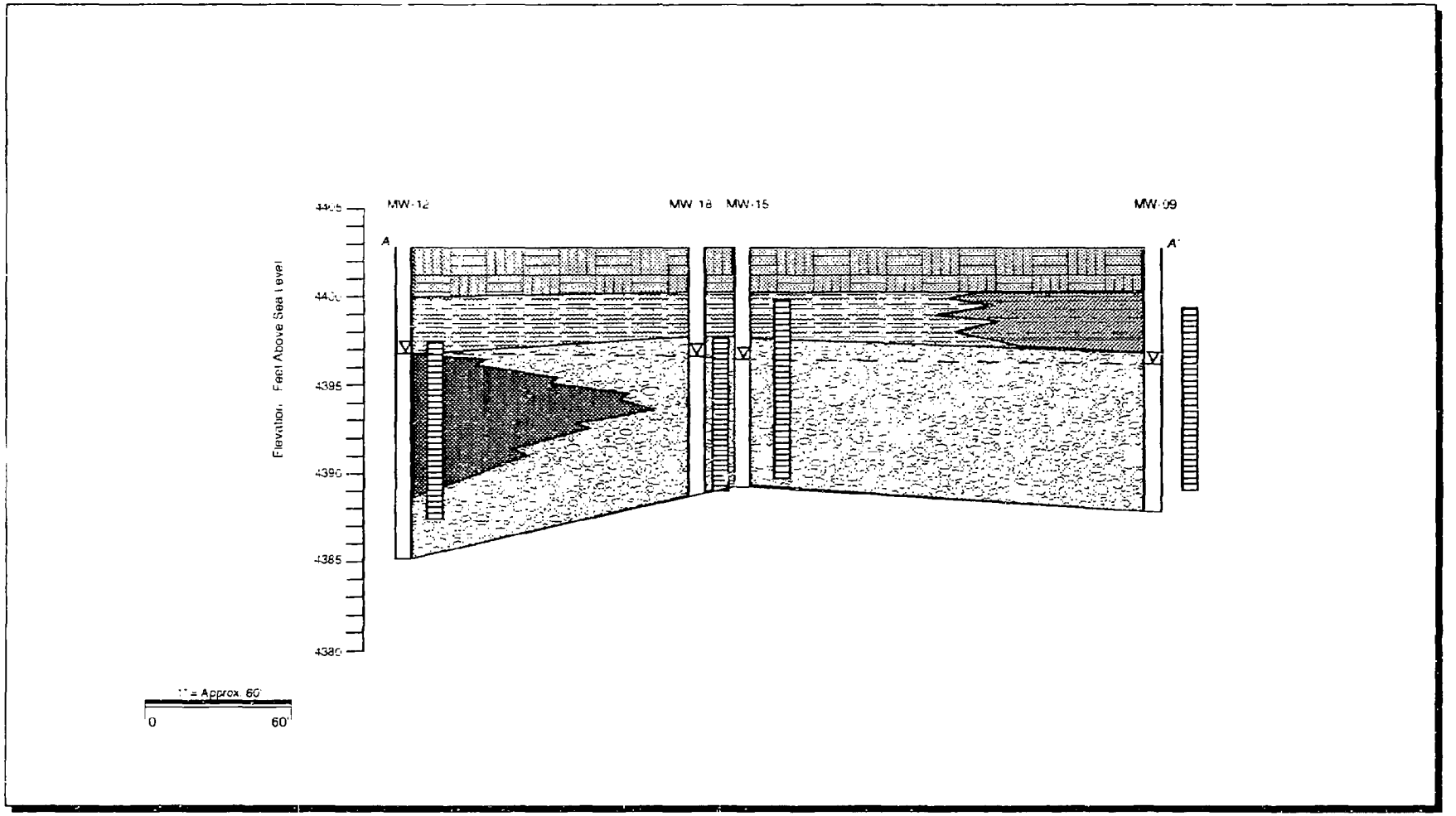
The following is a description of RI activities at IRP Site 14 - OWS, including geologic and hydrologic investigation results, screening results, soil and ground water investigation results, and conclusions.

5.6.1 Geologic and Hydrologic Investigation Results

The subsurface at Site 14 - OWS is comprised of fill material, pale-gray to olive-brown sandy silt, yellowish-brown to gray-brown silty clay with occasional sand, light-gray to gray-brown, fine- to medium-grained, poorly graded sand; and very dark gray, well-graded sandy gravel with occasional cobbles. The geologic cross section presented in Figure 5-32 was constructed using lithologic data from monitoring wells MW13 and MW12 from Site 13 and monitoring wells MW15 and MW09 from Site 14 - OWS.

Approximately 3 feet of fill material are present across Site 14 - OWS with the exception of monitoring well MW13, which has about 10 feet. The underlying silty clay reaches a maximum thickness of about 4 feet and grades into sandy silt between monitoring wells MW15 and MW09. Generally, the silt and silty clay are underlain by well-graded sandy gravel that contains a lens of poorly graded sand on the west end of the cross section. Actual thickness of the water-bearing, well-graded sand was not determined because none of the monitoring wells penetrated through it completely.

Water level elevation data collected at Site 14 - OWS monitoring wells were evaluated and the ground water flow direction was determined to be to the east during RI field work (late May 1995) and during quarterly monitoring conducted at the site (mid-August 1995 and November 1995). Potentiometric surface maps for the entire NVANG Base are presented in Figures 5-5, 5-6, and 5-6A. Unconfined aquifer conditions were encountered during drilling of the RI soil borings and SI monitoring wells at this site (Figure 5-32). Water levels in monitoring wells at Site 14 - OWS are immediately below the surficial silty clay layer that functions as the confining unit at other IRP sites at the NVANG Base.



LEGEND

- Fill
- Silty Clay
- Sand
- Gravelly Sand
- Silt
- Screened Interval of Well
- Water Level Taken 5/95

LOCATION MAP

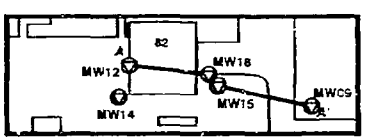


Figure 5-32
IRP Site 14-OWS
Geological Cross Section
152nd Tactical Reconnaissance Group, NVANG Base
Reno, Nevada

ERM-West, Inc. 7/95
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5.6.2 Screening Results

Appendix B presents the results of field screening of soil samples and ground water samples using the field GC. The results of the field screening generally correlated with the results of the laboratory analysis. The field GC results are also summarized on the lithologic logs presented in Appendix C.

5.6.3 Soil Investigation Results

Soil samples were collected for chemical analysis using a split-spoon drive sampler during drilling of soil borings SB14-1 through SB14-3 and SB14-5 located at Site 14 - OWS. Soil samples were not collected from soil boring SB14-4 due to the presence of a subsurface concrete slab. Soil sample and screening procedures are described in detail in Section 4.4. Table 5-22 summarizes the soil sampling program for chemical analysis.

Analytical results for soil samples collected from soil borings drilled at Site 14 - OWS are available from the locations specified in Appendix F. Summaries of detected compounds from the laboratory organic analysis are presented in Tables 5-23 through 5-25. The summary data are presented by soil boring number and depth at which each sample was collected. The identifier for each sample is indicative of sample collection depth. For example, sample identifier SB14-3-5.5 denotes the soil sample collected at soil boring SB14-3 at a depth of 5.5 to 6.0 feet bgs.

5.6.3.1 Volatile Organic Compounds. Several VOCs were detected in soil samples collected from soil borings SB14-1 through SB14-3 and SB14-5: 2-hexanone (32 µg/kg), 4-methyl-2-pentanone (18 µg/kg), acetone (42 to 383 µg/kg), methylene chloride (11 to 62 µg/kg), and xylenes (12 to 2,300 µg/kg). In general, the highest VOC concentrations in Site 14 - OWS soil samples were detected in sample SB14-3-5.5 (Table 5-23 and Figure 5-33).

5.6.3.2 Semivolatile Organic Compounds. Two SVOCs were detected in sample SB14-3-5.5: 2-methylnaphthalene (4,010 µg/kg) and naphthalene (4,750 µg/kg) (Table 5-24 and Figure 5-33).

5.6.3.3 Total Petroleum Hydrocarbons. TPH were detected in only two samples collected from soil boring SB14-3 at concentrations ranging from 169 to 2,500 mg/kg (Table 5-25 and Figure 5-34).

TABLE 5-22

Summary of Site 14 - OWS Soil and Ground Water Sample Collection Activities
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Matrix	Location Identifier	Date Sampled	Sampling Depths*, feet below ground level
Soil	SB14-1	5/24/95	3.5, 4**, 6**
	SB14-2	5/24/95	3.5, 5.5, 7.5**
	SB14-3	5/24/95	5.5, 7.5
	SB14-4	5/24/95	UTS
	SB14-5	5/25/95	3.5, 5.5, 7.5**, 9
Ground Water	MW15	5/12/95 8/21/95 11/14/95	NA
	MW18	5/12/95 8/21/95 11/13/95	NA

* = Sample depth listed is at the top of a 6-inch sample interval
** = Field gas chromatograph only
UTS = Unable to sample; encountered subsurface obstruction
NA = not applicable

TABLE 5-23

Volatile Organic Compounds Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram												
Location Identifier	Date Sampled	Laboratory Number	Acetone	Chlorobenzene	Chloroform	Methylene Chloride	2-Hexanone	2-Butanone	4-Methyl- 2-pentanone	PCE	TCE	Benzene	Ethylbenzene	Toluene	Xylenes (total)
SB14-1-3.5	5/24/95	88768	383	ND	ND	62	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-3.5	5/24/95	88769	202	ND	ND	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-3.5*	5/24/95	88770	133	ND	ND	31	32	ND	18	ND	ND	ND	ND	ND	ND
SB14-2-5.5	5/24/95	88771	117	ND	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-3-5.5	5/24/95	88773	127	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2300
SB14-3-7.5	5/24/95	88774	125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	105
SB14-5-3.5	5/25/95	88775	214	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12
SB14-5-5.5	5/25/95	88776	42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-5-9.0	5/25/95	88777	159	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	350,000	100,000	6,000	500	17,500	200,000	280,000	500	500	500	70,000	100,000	1,000,000

* = duplicate
PCE = tetrachloroethylene
TCE = trichloroethylene
ND = not detected

TABLE 5-24

Semivolatile Organic Compounds Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram													
Location Identifier	Date Sampled	Laboratory Number	Acenaphthene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Carbazole	Chrysene	Dibenzofuran	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2,4-Dichloro-phenol
SB14-1-3.5	5/25/95	88768	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-3.5	5/25/95	88769	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-3.5*	5/25/95	88770	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-5.5	5/25/95	88771	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-3-5.5	5/25/95	88773	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-3-7.5	5/25/95	88774	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-5-3.5	5/26/95	88775	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-5-5.5	5/26/95	88776	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-5-9.0	5/26/95	88777	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	210,000	1,050,300	200	200	200	140,000	200	180	480	14,000	60,000	60,000	7,500	11,000

TABLE 5-24

Semivolatile Organic Compounds Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

			Concentrations in micrograms per kilogram										
Location Identifier	Date Sampled	Laboratory Number	Dibenzo (a,h) anthracene	Fluorene	Fluoranthene	Indeno (1,2,3-cd) pyrene	2-Methyl-naphthalene	4-Methyl phenol	Naphthalene	Phenanthrene	Pyrene	1,2,4- Trichloro-benzene	bis(2-Ethylhexyl) phathalate
SB14-1-3.5	5/25/95	88768	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-3.5	5/25/95	88769	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-3.5*	5/25/95	88770	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-2-5.5	5/25/95	88771	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-3-5.5	5/25/95	88773	ND	ND	ND	ND	4010	ND	4750	ND	ND	ND	ND
SB14-3-7.5	5/25/95	88774	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-5-3.5	5/26/95	88775	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-5-5.5	5/26/95	88776	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB14-5-9.0	5/26/95	88777	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		Cleanup Level	200	140,000	140,000	200	140,000	200,000	140,000	140,000	110,000	7,000	600

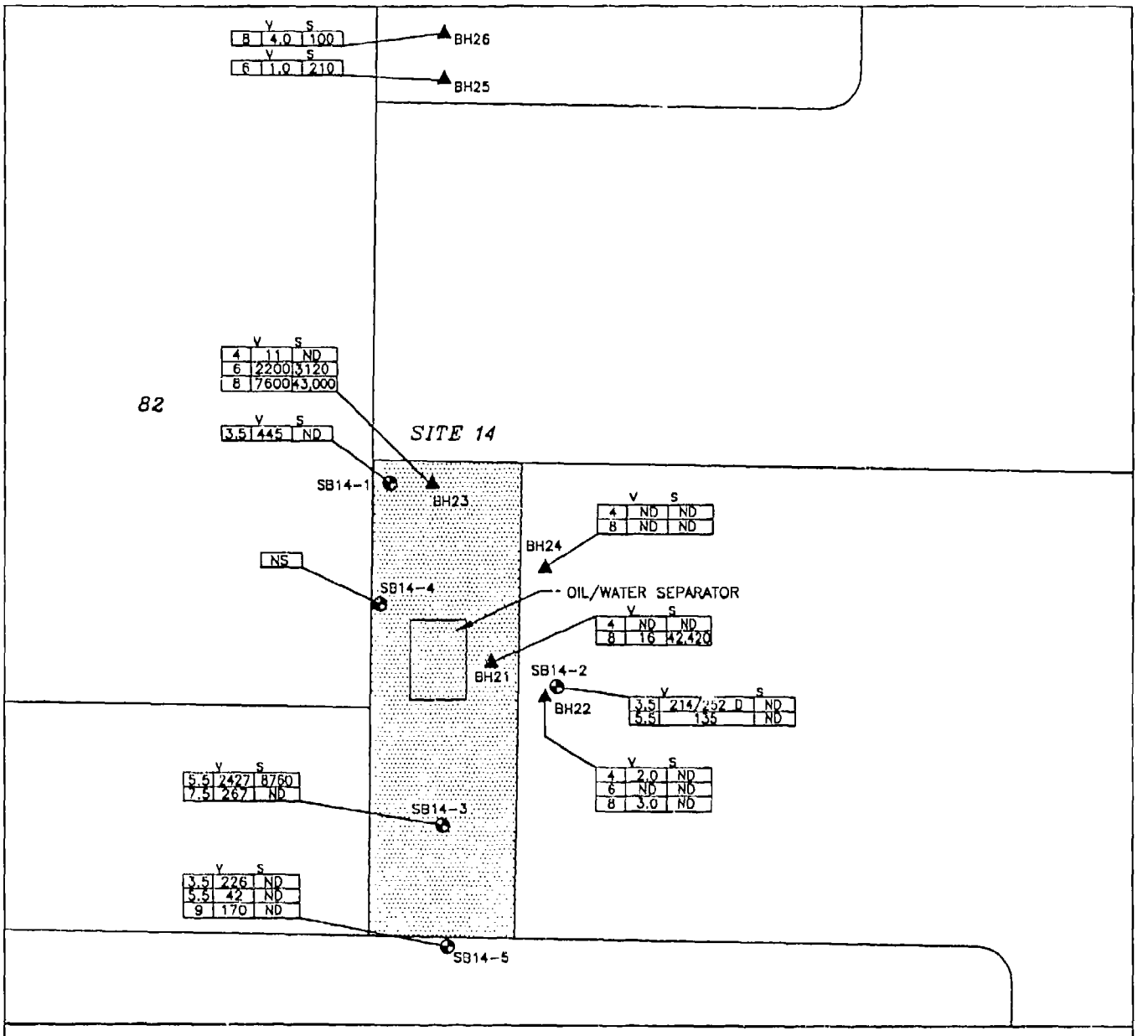
* = duplicate
ND = not detected

TABLE 5-25

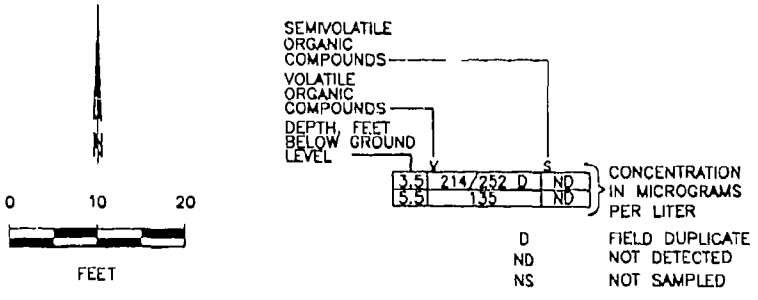
Total Petroleum Hydrocarbons Detected in Site 14 - OWS Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Location Identifier	Date Sampled	Laboratory Number	TPH, mg/kg
SB14-1-3.5	05/24/95	88768	ND
SB14-2-3.5	05/24/95	88769	ND
SB14-2-3.5*	05/24/95	88770	ND
SB14-2-5.5	05/24/95	88771	ND
SB14-3-5.5	05/24/95	88773	2,500
SB14-3-7.5	05/24/95	88774	169
SB14-5-3.5	05/25/95	88775	ND
SB14-5-5.5	05/25/95	88776	ND
SB14-5-9.0	05/25/95	88777	ND
		Cleanup Level	210

* = duplicate
mg/kg = milligrams per kilograms
TPH = total petroleum hydrocarbons
ND = not detected



EXPLANATION



ORIGINAL IRP SITE

SB14-2 SOIL BORING – REMEDIAL INVESTIGATION

BH22 SOIL BORING – SITE INVESTIGATION

FIGURE 5-33

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IRP SITE 14 – OWS,
TOTAL VOLATILE ORGANIC COMPOUNDS
AND TOTAL SEMIVOLATILE ORGANIC
COMPOUNDS IN SOIL
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

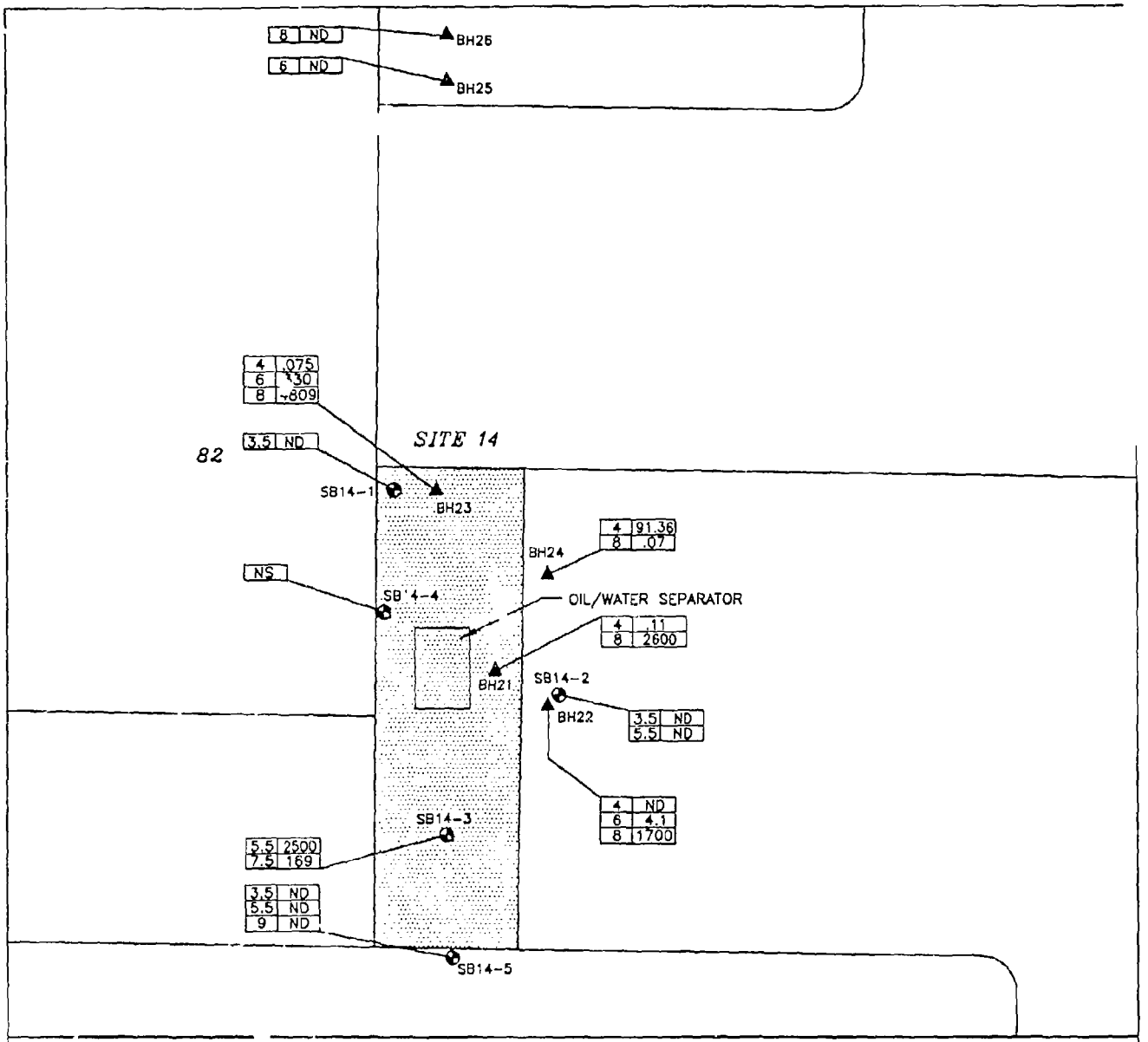


FIGURE 5-34

F:\HOME\SHARON\RENO\NEW!'ENO\95335-31.DWG

IRP SITE 14 - OWS,
TOTAL PETROLEUM HYDROCARBONS
IN SOIL
152nd TACTICAL RECONNAISSANCE GROUP
NVANG, RENO, NEVADA

ERM

5.6.4 Ground Water Investigation Results

Ground water samples were collected from Site 14 - OWS in May 1995 from monitoring wells MW15 and MW18. Quarterly monitoring rounds were conducted at the site in August 1995 and November 1995. Ground water sampling and screening procedures are described in detail in Section 4.4. Table 5-22 summarizes the ground water sampling program for chemical analysis.

Complete analytical results for ground water samples collected from monitoring wells at Site 14 - OWS are available at the locations specified in Appendix F. Section 2.3.4 presents a summary of ground water chemical quality data collected from Site 14 - OWS monitoring wells prior to the RI.

Methylene chloride was the only VOC detected in ground water samples collected from monitoring wells MW15 and MW18. Detection of this compound is considered indicative of laboratory contamination. SVOCs were not detected in RI ground water samples collected from monitoring wells MW15 and MW18. TPH and lead were also not detected in RI ground water samples.

5.6.5 Conclusions

ERM compared the results of SI and RI soil and ground water chemical analyses for Site 14 - OWS to numerical cleanup standards developed for the NVANG Base. The development of these cleanup standards is described in Section 8.0 - Risk Assessment. The purpose of the comparison was to identify areas of ground water and soils that may require remediation. The results of the comparison indicated that TPH exceeded cleanup standards in one or more RI and/or SI soil samples.

Figure 5-35 depicts the approximate area where TPH in soils exceeds cleanup standards. The extent of the TPH-impacted soil is consistent with release history at Site 14 - OWS (Section 2.3.4.2). Historical information suggests that several small JP-4 fuel spills (less than 50 gallons) have occurred near the corner of Building 82 and at least one overflow event has occurred at the Oil/Water Separator. Many of the more volatile components of JP-4 fuel (such as benzene, ethylbenzene, and toluene) were not detected in Site 14 - OWS soils. The absence of these components suggests that in-situ degradation of the spilled fuel has occurred. The remaining semivolatile components of JP-4 fuel have low solubility, inhibiting their transport to ground water (Section 7).

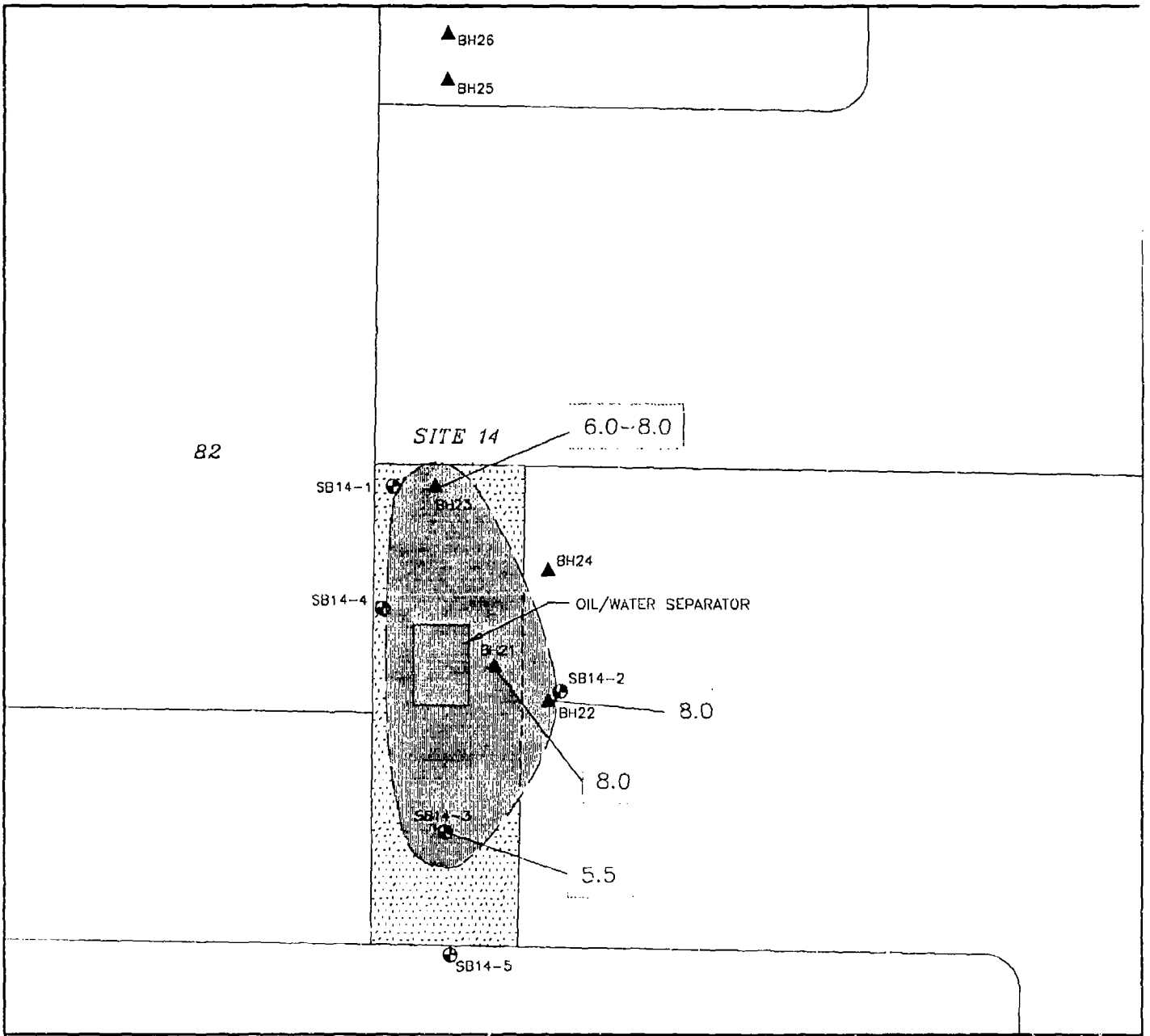


FIGURE 5-35

C:\RENOANG\9540\9540F535

AREA OF IRP SITE 14 - OWS,
SOILS EXCEEDING REGULATORY LIMITS

152nd TACTICAL RECONNAISSANCE GROUP,
NVANG, RENO, NEVADA

ERM

It does not appear that TPH-impacted soils currently provide a significant source of fuel-related hydrocarbons to ground water. Ground water data collected during the SI and the RI suggest that minor concentrations of fuel-related hydrocarbons have been transported to ground water. It is recommended that long-term monitoring be performed for Site 14 - OWS ground water to detect the possibility of future problems.

SECTION 6.0

DISCUSSION OF ARARS

The following sections provide a preliminary summary of key Applicable or Relevant and Appropriate Requirements (ARARs) that may be relevant to FS development for the NVANG Base. ARARs will be more fully evaluated during the FS. The following preliminary ARARs have been identified.

6.1 Potential Federal ARARs

A discussion of the potential federal ARARs is given below.

6.1.1 CERCLA

Section 121 (d) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, addresses the management of federal facilities. The IRP has been designed to mirror site investigation requirements under CERCLA (PA/SI/RI/FS/RD/RA).

6.1.2 Resource Conservation and Recovery Act

Federal Resource Conservation and Recovery Act regulations governing hazardous waste management provide both action- and chemical-specific ARARs that may apply to IRP activities at the NVANG Base.

6.1.2.1 Waste Identification. Materials excavated or removed from the site (e.g., drill cuttings, contaminated soil, and contaminated ground water) are regulated as hazardous waste if they meet the federal definition provided in 40 Code of Federal Regulations (CFR) 261.

6.1.2.2 Waste Generation and Transport. RI activities or remedial alternatives involving the movement or removal of hazardous waste trigger RCRA hazardous waste generator requirements provided in 40 CFR 262. When hazardous waste is shipped off site in regulated amounts, the manifesting and transport procedures in 40 CFR 263 must

be followed. As applicable, the NVANG Base will sign all hazardous waste manifests as the generator of the waste.

6.1.2.3 Land Disposal Restrictions. RCRA regulations in 40 CFR 268 set forth Land Disposal Restrictions (also known as Land Ban Requirements) for RCRA wastes. These restrictions were required by the Hazardous and Solid Waste Amendments of 1984 to RCRA to prohibit the continued land disposal of hazardous wastes beyond specified dates. However, wastes treated in accordance with chemical-specific treatment standards provided in 40 CFR 268 Subpart D may be land-disposed as provided therein. The Land Disposal Restrictions potentially affect the storage and disposal of hazardous wastes generated during RI or subsequent remedial activities and may be considered both action- and chemical-specific ARARs.

6.1.2.4 Treatment, Storage, and Disposal (TSD) Facilities. If remedial alternatives for the site involve the construction or off-site use of RCRA treatment, storage, or disposal (TSD) facilities, regulations provided in 40 CFR 264 become action-specific ARARs. Various subsections of 40 CFR 264 govern standards and procedures for the operation of hazardous waste TSD facilities. For example, a common disposal practice is to create a waste pile of contaminated soil as part of the remediation process. 40 CFR 264 Subpart L promulgates federal RCRA standards for waste piles, including their design, operating requirements, monitoring and inspection, closure, and post-closure care. Other subparts control tank systems, surface impoundments, land treatment units, landfills, incinerators, and miscellaneous TSD units.

6.1.3 Safe Drinking Water Act

Federal regulations pursuant to the Safe Drinking Water Act govern the quality, usage, and discharge of ground water. MCLs specified in 40 CFR 141.11-141.16 are legally enforceable federal drinking water standards established by the EPA. Maximum contaminant level goals (MCLGs) specified in 40 CFR 141.50-141.51 are nonenforceable, health-based goals for drinking water. MCLGs are set at levels at which no adverse health effects may arise. MCLs are set as close as practical to MCLGs. For noncarcinogens, MCLs are nearly always set at the MCLG. The EPA believes that MCLs are protective of public health; however, it does not recognize that specific circumstances may require more stringent standards (i.e., MCLGs) for the protection of public health and the environment These ARARs may be used to identify a range of target cleanup levels for ground water at the NVANG Base. Table 6-1 contains a list of MCLs for constituents detected in ground water during RI activities.

TABLE 6-1

Maximum Contaminant Levels and Cleanup Levels for Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Maximum Concentrations of Organic Compounds (All concentrations in micrograms per liter)	
	Federal Maximum Contaminant Level	Subpart S (calculated)
Volatile Organic Compounds		
Benzene	5	
Chlorobenzene (monochlorobenzene)	100	
Toluene	1,000	
Ethylbenzene	700	
Xylenes (total)	10,000	
Trichloroethylene	5	
Semivolatile Organic Compounds		
bis(2-Ethylhexyl)phthalate	6	
1,2-Dichlorobenzene (o-)	600	
1,3-Dichlorobenzene (m-)	600	
1,4-Dichlorobenzene (p-)	75	
2,4-Dimethylphenol	NA	700
2-Methylnaphthalene	NA	1,400
Naphthalene	NA	1,400
Phenananthrene	NA	1,400
Di-n-octyl phthalate	NA	700

Note: Refer to Section 8 for a description of the derivation of the above listed cleanup levels.

6.1.4 Clean Water Act

The federal Clean Water Act and pursuant regulations provide potential location-, chemical-, and action-specific ARARs for IRP activities at the NVANG Base.

6.1.4.1 Ambient Water Quality Criteria (AWQC). The EPA has promulgated Ambient Water Quality Criteria (AWQC) for surface and ground water through 40 CFR 131. Aligned with the Federal Clean Water Act criteria, the standard governing AWQC presents scientific data and guidance on the environmental effects of pollutants, rather than only establishing regulatory requirements. As a result, decision-makers evaluating remedial alternatives may compare their water quality data to federal data and guidance. Candidate remedial actions involving contaminated surface water or ground water must be evaluated within the context of follow-on water usage and the circumstances of the actual or potential release before implementation. As a general statement, AWQC are applied when evaluating cleanup levels for ground water.

6.1.4.2 National Pollutant Discharge Elimination System (NPDES). National Pollutant Discharge Elimination System (NPDES) regulations govern discharges to surface water and control surface water runoff from Station stormwater discharge systems. Promulgation of Clean Water Act Section 402 and formal ARARs are established for NPDES through 40 CFR 122 and 40 CFR 125, and provide action- and chemical-specific ARARs. The discharge of development water or produced water from monitoring wells will be in accordance with NPDES regulations.

6.1.5 Occupational Safety and Health Act (OSHA)

All site operations are governed by Occupational Safety and Health Act (OSHA) standards under 29 CFR 1910. The Health and Safety Officer for the RI/FS field investigation will ensure all site workers meet the requirements of the health and safety plan, possess and use all personal protective equipment, and take all precautions to eliminate exposure to unsafe or unhealthy situations. Other applicable OSHA ARARs include health and safety for federal service contracts (29 CFR 1926) and recordkeeping and reporting under 29 CFR 1904.

6.1.6 Hazardous Materials Transportation Act

If material containing hazardous wastes is to be transported off site, U.S. Department of Transportation hazardous material transportation

requirement in 49 CFR 171-179, pursuant to the federal Hazardous Materials Transportation Act, may be action-specific ARARs for RI activities. These requirements are supplemental to RCRA transporter requirements in 40 CFR 263.

6.1.7 Clean Air Act

The Federal Clean Air Act may provide action- and chemical-specific ARARs for IRP activities, including subsequent field investigations and remedial actions, including soil excavation or incineration. All remediation activities must comply with National Primary and Secondary Ambient Air Quality Standards found in 40 CFR 50. Rules governing particulate matter less than 10 microns in size (PM_{10}) are contained in 40 CFR 50, and are important from the potential detrimental effects of such particles on the lungs. All field activities involving air emissions must ensure compliance with the PM_{10} standard.

6.1.8 Federal Guidance To Be Considered

In addition to federal and state requirements that may be applicable or relevant and appropriate to IRP activities, federal nonregulatory criteria must be considered. Chemical-specific federal nonregulatory criteria, used to help characterize risks and to set cleanup goals, include the following:

- EPA Risk Reference Doses;
- EPA Health Advisories;
- EPA Carcinogen Assessment Group Potency Factors;
- EPA Acceptable Intake Values, Chronic and Subchronic; and
- EPA guidance manual on water-related fate of 129 priority pollutants.

6.2 State Requirements

One State of Nevada requirement applicable for activities at the Base is NDEP's *Nevada Soil and Ground Water Remediation Policy* (June 25, 1992). The intent of this policy is to provide a process to govern remedial action and cleanup standards. The policy utilizes existing state and/or federal regulatory standards, if available, as the initial

criteria. If such standards are not available or have not been developed for a particular contaminant, then other methods have been devised to determine remediation standards. Application of this policy to impacted soil and ground water at the NVANG Base is outlined in Section 8 of this report (Risk Assessment). Tables 6-1 and 6-2 summarize cleanup levels computed based on the NDEP remediation policy.

Another State of Nevada requirement applicable to activities at the Base is the policy governing required cleanup of petroleum hydrocarbon product from ground water. The UST Division of the NDEP has a policy that requires product recovery if one-half inch or more of free product is present on the ground water surface. The State of Nevada also has a statutory soil action level of 100 mg/kg of a petroleum substances present in soil (NAC 459.9973). An additional statute (NAC 459.9974) indicates that petroleum substances removed through a corrective action must be disposed of in a class I sanitary landfill or at a disposal or treatment facility approved by the NDEP.

TABLE 6-2

Cleanup Levels for Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Concentrations in micrograms per kilogram			
	Cleanup Level (based on Subpart S)	Cleanup Level (Ground Water Protection)	Method (Ground Water Protection)	Chemical Surrogate
olatile Organic Compounds				
Acetone	8,000,000	350,000	Subpart S x 100	
Benzene	24,000	500	TCLP	
2-Butanone	48,000,000	200,000	TCLP	
Chlorobenzene	1,600,000	100,000	TCLP	
Chloroform	120,000	6,000	TCLP	
Ethylbenzene	8,000,000	70,000	MCL x 100	
2-Hexanone	400,000	17,500	Subpart S x 100	n-hexane/12
Methylene Chloride	93,000	500	MCL x 100	
4-Methyl-2-Pentanone	6,400,000	280,000	Subpart S x 100	
Tetrachloroethylene	14,000	500	MCL x 100	
Toluene	16,000,000	100,000	MCL x 100	
Trichloroethylene	64,000	500	TCLP	
Xylenes (total)	160,000,000	1,000,000	MCL x 100	
Semivolatile Organic Compounds				
Acenaphthene	4,800,000	210,000	Subpart S x 100	
Anthracene	24,000,000	1,050,000	Subpart S x 100	
Benzo(a)anthracene	960	200	MCL x 100	benzo(a)pyrene
Benzo(a)pyrene	96	200	MCL x 100	
Benzo(b)fluoranthene	960	200	MCL x 100	benzo(a)pyrene
Benzo(g,h,i)perylene	3,200,000	140,000	Subpart S x 100	naphthalene
Benzo(k)fluoranthene	9,590	200	MCL x 100	benzo(a)pyrene
bis(2-Ethylhexyl)phthalate	50,000	600	MCL x 100	
Carbazole	35,000	180	Subpart S x 100	
Chrysene	96,000	480	Subpart S x 100	
Dibenzo(a,h)anthracene	96	200	MCL x 100	benzo(a)pyrene
Dibenzofuran	320,000	14,000	Subpart S x 100	naphthalene
1,2-Dichlorobenzene	7,200,000	60,000	MCL x 100	
1,3-Dichlorobenzene	7,200,000	60,000	MCL x 100	1,2-dichlorobenzene
1,4-Dichlorobenzene	29,000	7,500	TCLP	
2,4-Dichlorophenol	240,000	11,000	Subpart S x 100	
Fluoranthene	3,200,000	140,000	Subpart S x 100	
Fluorene	3,200,000	140,000	Subpart S x 100	
2-Methylnaphthalene	3,200,000	140,000	Subpart S x 100	naphthalene
4-Methylphenol	400,000	200,000	TCLP	
Indeno(1,2,3-cd)pyrene	960	200	MCL x 100	benzo(a)pyrene
Naphthalene	3,200,000	140,000	Subpart S x 100	
Phenanthrene	3,200,000	140,000	Subpart S x 100	naphthalene
Pyrene	2,400,000	110,000	Subpart S x 100	
1,2,4-Trichlorobenzene	800,000	7,000	MCL x 100	
JP-4 (TPH)	4,800	210	Subpart S x 100	n-hexane

Note: Refer to Section 8 for a description of the derivation of the above listed cleanup levels.

SECTION 7.0

CONTAMINANT FATE AND TRANSPORT

The following section summarizes the environmental fate and potential transport for those compounds identified to be present at concentrations exceeding regulatory limits in NVANG Base soils and/or ground water. Information regarding derivation of the regulatory concentration limits is provided in Section 8.0 of this report.

Also included in this section is a tabular listing of physical and chemical properties for the compounds (Table 7-1). The table lists those properties that influence physical transport and that impact selection of remedial alternatives. The properties include Henry's Law Constant (H), water solubility, and organic carbon/water partition coefficient (Koc). The following sections provide a brief summary of the relevance of these physical and chemical properties to contaminant fate and transport.

H provides an indication of the tendency of a constituent to volatilize or "partition" from the aqueous or water phase to the vapor phase. Organic compounds having H values greater than 10^{-3} atmosphere-cubic meter per mole (atm-m^3/mol) tend to volatilize from water. Organic compounds having H values less than 10^{-3} atm-m^3/mol may volatilize from water, but other processes such as adsorption to soil may be more important.

Water solubility is an important property affecting compound migration in soils and ground water. It is expressed in terms of the number of milligrams of a compound that can be dissolved in one liter of water under standard conditions of 25°C and one atmosphere of pressure. The higher the value of solubility, the greater the tendency for a compound to dissolve in water and hence be transported through soil and ground water.

Koc provides an index of the affinity of affinity of an organic compound to organic carbon in soils. Laboratory studies have shown organic forms of carbon present in soils or aquifer provides adsorption sites for organic compounds. When a compound adsorbs to organic carbon, its movement through soil or ground water is slowed or retarded. Koc provides a measure of the potential for a compound to

TABLE 7-1

Physical and Chemical Properties of Compounds Detected in NVANG Base Soil and Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Compound	Organic Compound Group	Chemical Formula	Henry's Law Constant (atm-m3/mol)	Log Koc (ml/g)	Water Solubility, mg/l at 25°C	Half-Life Classes (Mackay et al, 1992 and 1993)	
						Water	Soil
Benzene	Monoaromatic Hydrocarbon	C_6H_6	5.50E-03	1.69	1800	5	4
Benzo(a)anthracene	Polynuclear Aromatic Hydrocarbon	$C_{18}H_{12}$	6.60E-07	6.14	0.014	6	8
Benzo(a)pyrene	Polynuclear Aromatic Hydrocarbon	$C_{20}H_{12}$	<2.40E-05	6.7	0.004	6	8
Benzo(b)fluoranthene	Polynuclear Aromatic Hydrocarbon	$C_{20}H_{12}$	1.20E-05	5.74	0.0012	6	8
Benzo(k)fluoranthene	Polynuclear Aromatic Hydrocarbon	$C_{20}H_{12}$	1.40E-04	6.64	0.00055	6	8
Bis(2-Ethylhexyl)phthalate	Phthalate Ester	$C_{24}H_{38}O_4$	1.10E-05	5	0.4	NA	NA
Carbazole	Aromatic Amine	$C_{12}H_9N$	NA	NA	NA	NA	NA
Chrysene	Polynuclear Aromatic Hydrocarbon	$C_{18}H_{12}$	7.26E-20	5.39	0.0014	6	8
1,4-Dichlorobenzene	Chlorobenzene	$C_6H_4Cl_2$	3.10E-03	2.2	79	6	7
Dibenzo(a,h)anthracene	Polycyclic Aromatic Hydrocarbon	$C_{22}H_{14}$	7.33E-09	6.22	0.0005	6	8
Indeno(1,2,3-cd)pyrene	Polynuclear Aromatic Hydrocarbon	$C_{22}H_{12}$	2.96E-20	7.49	0.062	NA	NA
1,2,4-Trichlorobenzene	Chlorobenzene	$C_6H_3Cl_3$	2.30E-03	2.7	19	6	7
Trichloroethylene	Chlorinated Aliphatic Hydrocarbon	C_2HCl_3	9.10E-03	1.81	1000	5	6
Toluene	Monoaromatic Hydrocarbon	$C_6H_5CH_3$	6.7E-03	2.06	490	5	4

Half Life Classes	Range, hours
Class 4	100-300
Class 5	300-1,000
Class 6	1,000-3,000
Class 7	3,000-10,000
Class 8	10,000-30,000

atm-m3/mol = atmospheres-cubic meter per mole
Log Koc = base 10 logarithm of the organic carbon/water partition coefficient
mg/g = milligrams per gram
mg/l = milligrams per liter

adsorb to soil and aquifer materials. The higher the Koc, the more likely the compound is to absorb to organic carbon.

The following sections present information from a variety of sources, including ORNL/Health and Safety Research Division (1989), Sims et al (1991), Montgomery and Welkom (1990), Mackey et al (1992 and 1993), and ORNL/ETS (1995).

7.1 JP-4 and its Components

This section provides a discussion of the fate and transport of JP-4 and its component compounds. JP-4 fuel and its component compounds have been detected at elevated concentrations in soil and/or ground water at all of the sites investigated.

The fate and transport of fuel hydrocarbons is complex because fuels in general, and JP-4 in particular, are composed of many individual hydrocarbons of widely varying physical and chemical properties. JP-4 is made by blending various distillate stocks such as naptha, gasoline, and kerosene. Each of these distillate stocks is composed of mixtures of hydrocarbons of varying composition. JP-4, for example, contains component hydrocarbons ranging primarily from C-4 to C-14 compounds with a distillation range of 140 to 270°C. Laboratory analysis has shown that the approximate chemical composition for JP-4 is 61 percent alkanes, 29 percent cycloalkanes, 8 percent alkylbenzenes, 1 percent indans and tetralins, and less than 1 percent naphthalenes. The environmental behavior of individual hydrocarbons within each of these groups can vary significantly.

Several compounds detected in NVANG Base soils are classified as PAHs. The compounds can result from combustion or burning JP-4 fuel.

7.1.1 Potential Routes of Migration

JP-4 has been detected as floating product on the ground water surface at Site 7 - POL Storage Area. JP-4-derived organic compounds have also been detected in soils extending from the surface to the top of the saturated zone. Potential routes of migration for JP-4 and its constituents include:

- Lateral flow of floating product on the water table;

- Vapor movement of constituent compounds in the vadose zone and from the vadose zone to the atmosphere;
- Transport of constituent compounds in solution or via sediment transport from surface soils via surface water runoff;
- Vertical transport of constituent compounds from the vadose zone to ground water via leaching; and
- Horizontal transport of constituent compounds in ground water via ground water flow.

7.1.2 Contaminant Persistence

The following subsections describe the chemical and biological reactions undergone by fuel hydrocarbons in the environment. Persistence of individual JP-4 constituents will vary depending on the chemical properties of the constituents. Some constituents will dissolve quickly in water, be sorbed less strongly onto soils, and may be more or less susceptible to degradation by chemical or biological action. Thus, the relative concentration of the constituents of the fuel will vary with time and distance from the site of initial contamination. This effect is called "weathering".

Biodegradation and chemical reactions such as volatilization and photo oxidation are the primary fate processes for fuel hydrocarbons in the environment.

7.1.2.1 Chemical Reactions. For fuel hydrocarbons, volatilization and photo oxidation are expected to be the most important chemical reactions in determining compound fate. However, the occurrence of these chemical reactions are dependent upon the nature of a fuel hydrocarbon release. Studies have shown that for releases of JP-4 to surface soils, hydrocarbon volatilization and subsequent photolysis in the atmosphere can occur. A release or the percolation of fuel hydrocarbons to the subsurface limits exposure to solar radiation, and these chemical reactions are therefore less likely.

Under environmental conditions, chemical reactions other than volatilization and photo oxidation of fuel hydrocarbons generally do not occur. Chemical reactions involving alkanes, which are a primary functional group in the composition of fuel hydrocarbons, usually take place only under vigorous laboratory circumstances involving free-radical chain reactions. Halogenation of an alkane can occur, but only if the halogen is disassociated into its individual atoms. Disassociation of a halogen requires ultra-violet light or temperatures in the range of

200 to 400° C. Alkanes can also undergo chemical reaction by pyrolysis, which is the disassociation of the alkane itself. Pyrolysis of alkanes occurs at temperatures in the range of 400 to 600°C, and so is not a naturally occurring environmental reaction.

Aromatic compounds such as benzene and toluene are another primary functional group in the composition of fuel hydrocarbons. As with alkanes, chemical reactions involving aromatic compounds are unlikely to occur under environmental conditions. This is primarily because the ring structure of an aromatic compound requires more energy to break than is typically available in the environment.

Naturally occurring chemical reactions of fuel hydrocarbons, specifically haloalkanes, have been demonstrated. However, naturally occurring chemical reactions involving haloalkanes are not typically an important factor in assessing environmental persistence due to the very small rate constants associated with the reactions.

7.1.2.2 Biodegradation. Biodegradation is an important factor in environmental fate processes for fuel hydrocarbons. Many of the hydrocarbon components of JP-4 are easily biodegraded in the environment; however, the actual amount of biodegradation is site-specific and dependent upon hydrocarbon concentrations. Very high concentrations of fuel hydrocarbons may be toxic to bacterial growth, while low concentrations may not be adequate to stimulate bacterial metabolism. Bacteria additionally require moisture and nutrients to thrive.

Recent studies have shown that indigenous bacteria, capable of metabolizing fuel hydrocarbons, are ubiquitous in subsurface environments. Bacteria in deeper soil generally have lower activities than do those in surface soils but mineralization of hydrocarbons can occur under aerobic conditions in deeper soil. Additionally, although bacteria in ground water are generally less active than in soil, biodegradation processes in ground water will usually progress indefinitely because of the continuous supply of nutrients and moisture.

In general, the primary conditions effecting the biodegradation of fuel hydrocarbons are the presence of oxygen, nutrients and moisture.

7.1.3 Contaminant Migration

Transport processes have been demonstrated to be more significant than transformation processes in determining the initial fate of petroleum hydrocarbon releases to soil and ground water systems. For

JP-4 released to surface soils or waters, transport to the atmosphere through volatilization has been shown to be the primary fate pathway for most of the JP-4 hydrocarbons. Under conditions where volatilization is limited, such as low temperatures, subsurface release, or a concentrated spill, downward migration into the soil and to ground water may be a significant migration route.

Volatilization and photo oxidation as well as biodegradation can effect the environmental fate and transport of fuel hydrocarbons. Chemical reactions, however, are typically less important than biodegradation in assessing fuel hydrocarbon fate in the environment. Table 7-1 presents a summary of available data for the half-life of JP-4 derived compounds. The half-life ranges provide an order of the persistence of the compounds in ground water or soil

7.2 Trichloroethylene

This section provides a discussion of the fate and transport of TCE. TCE has been detected at concentrations equal to or greater than the MCL in ground water samples collected from monitoring wells MW05 (Site 4 - Former FTA) and MW08 (Site 12 - Aircraft Parking Apron Area).

7.2.1 Potential Routes of Migration

TCE has been detected in elevated concentrations in ground water at Sites 4 and 12. Potential routes of migration for TCE includes:

- Vapor movement of TCE from the water table to the vadose zone and from the vadose zone to the atmosphere; and
- Horizontal transport of TCE in ground water via ground water flow.

7.2.2 Contaminant Persistence

The environmental reactions which result in the degradation of TCE are reviewed in the following subsections. Three degradation processes are discussed here: aerobic processes, anaerobic processes, and abiotic processes.

7.2.2.1 Aerobic Processes. Aerobic degradation is a biological process in which bacteria utilize oxygen molecules in a water/soil system to degrade organic compounds. In the aerobic degradation process, the bacteria derive energy from the breakdown reaction, and utilize the

organic compound as a source of carbon. The aerobic process typically involves the addition of oxygen and the removal of hydrogen from the organic compound, such that the compound is oxidized.

The results of early laboratory studies indicated that the aerobic degradation of chlorinated solvents such as TCE was not possible; however, more recent studies have indicated that aerobic degradation of chlorinated solvents can occur, particularly when degrading bacteria are stimulated by the addition of methane and oxygen. However, this aerobic process is not believed to occur under natural conditions.

7.2.2.2 Anaerobic Processes. Anaerobic processes are those in which organic compounds are degraded by bacteria in the absence of oxygen. Instead, in anaerobic degradation, the bacteria utilize inorganic, oxygen bearing compounds such as nitrates, sulfates and carbon dioxide to degrade organic compounds. Studies have reported that under methanogenic conditions, where sulfate is used by bacteria to facilitate degradation, the degradation of TCE can occur via reductive dechlorination.

Reductive dechlorination is a process where bacterial action results in the removal of chlorine atoms from the chlorinated solvent. In anaerobic processes, reductive dechlorination will remove a chlorine atom from TCE resulting in transformation to a DCE isomer. Continued reductive dechlorination transforms the DCE isomer to vinyl chloride, and finally the reductive dechlorination process concludes with the transformation of vinyl chloride to ethene. The DCE isomer and vinyl chloride are referred to as intermediary chemical components of the reductive dechlorination process. Anaerobic degradation of chlorinated solvents was discovered when aquifers were found contaminated with intermediary chemical components which had not historically been used at the overlying sites.

Studies have indicated that during anaerobic degradation, the relative ratios of intermediary chemical components such as DCE and vinyl chloride are dependent upon the level of methanogenic activity of the water/soil system. Under typical environmental conditions, DCE will be more predominant than vinyl chloride. When methanogenic activity is very high, however, vinyl chloride will be the predominant intermediary chemical component.

Laboratory studies have not reached agreement as to which DCE isomer is formed from TCE during the anaerobic process Various studies have indicated that 1,1-DCE as well as trans-1,2-DCE and cis-1,2-DCE are formed while another study have found that only the intermediary chemical component, 1,2-DCE. It has been suggested that

pH plays a role in the specific DCE isomer(s) formed from the reductive dechlorination of TCE.

In summary, while it is known that chlorinated organic compounds will degrade under anaerobic processes, the specific conditions required to initiate and maintain anaerobic processes are not well understood. The presence of only low concentrations of an organic compound in a water/soil system may not be adequate to stimulate bacterial growth such that anaerobic process are initiated. In addition, certain oxygen sources may be required by degrading bacteria to breakdown specific organic compounds. For example, there is conflicting research regarding the degradability of TCE under denitrifying conditions. Finally, the conditions that effect the rates at which anaerobic processes proceed are not completely quantified. It has been suggested that there is a specific redox potential threshold above which degradation TCE to vinyl chloride will occur rapidly.

7.2.2.3 Abiotic Processes. Abiotic processes involve strictly chemical and photochemical reactions, and physical processes such as leaching and volatilization. Abiotic processes can be important in the assessment of the degradation characteristics of a water/soil system.

TCE can also degrade abiotically. TCE may undergo a reductive dehalogenation process to form 1,1-DCE, cis-1,2-DCE or trans-1,2-DCE. This is typically a biological reaction, however, and is not a significant abiotic degradation reaction for TCE.

7.2.3 Contaminant Migration

TCE may undergo aerobic, anaerobic or abiotic degradation processes. In each case, however, these processes produce one or more isomers of DCE or vinyl chloride. Trans-1,2-DCE has been detected in ground water samples collected from Site 12 - Aircraft Parking Apron Area monitoring well MW08. Presence of this compound in ground water may indicate that degradation reactions may be occurring in ground water underlying the Base. Table 7-1 presents a summary of available data for the half-life of TCE in ground water and soils.

SECTION 8.0

RISK ASSESSMENT

Information provided by the NDEP indicates that the regulatory structure currently in place in Nevada (as of January 1996) does not allow the application of risk assessments in lieu of numerical cleanup standards. The agency provides a list of action level concentrations for soil and ground water in its *Contaminated Soil and Ground Water Remediation Policy* dated June 25, 1992. However, application of the policy to the NVANG Base required some research regarding the most recent toxicological data for the compounds detected in Base ground water and soils. Additionally, information regarding potential fate and transport of compounds detected at the NVANG Base were used to outline the exposure scenarios that are required to apply the NDEP remediation policy to impacted soils and ground water. The following subsections provide a summary of processes and procedures used to develop action level concentrations for NVANG Base soils and ground water.

8.1 Potential Soil Remediation Standards

Consistent with NDEP guidance, the development of potential remediation standards for soils considered all potential exposure pathways associated with this medium. Based on analysis of potential exposures at the site, soil remediation standards were derived for two separate exposure pathways: direct contact with soils and protection of ground water. Direct contact standards were calculated following the methodology established in Subpart S of the RCRA Corrective Action Rule (EPA, July 1990). These calculated values reflected current toxicity data listed in Integrated Risk Information System (IRIS), EPA's primary toxicity data base (accessed July 1995), and in the compilation of preliminary remediation goals prepared by EPA/Region IX (September 1995). Table 8-1 presents a summary of toxicological factors used in the remediation goal calculations.

Soil remediation standards developed for evaluation of the ground water pathway were based on a tiered approach, as described below:

- Where a Toxicity Characteristic Leaching Procedure (TCLP) standard was available, that numeric value was used as the remediation

TABLE 8-1

Toxicological and Regulatory Data for Detected Compounds and Surrogates
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Reference Dose-oral (mg/kg/day)	Carcinogenic Slope Factor-oral (mg/kg/day)^-1	Carcinogenic Class	TCLP (mg/l) Limit	MCL (mg/l)
Volatile Organic Compounds					
Acetone	0.1		D		
Benzene		0.029	A	0.5	0.005
2-Butanone	0.6		D	200	
Chlorobenzene	0.02		D	100	0.1
Chloroform	0.01	0.0061	B2	6	0.1/0.08
Ethylbenzene	0.1		D		0.7
2-Hexanone	(use n-hexane values and divide by 12)		D		
Methylene chloride	0.06	0.0075	B2		0.005
4-Methyl-2-pentanone	0.08		D		
Tetrachloroethylene	0.01	0.052	B2		0.005
Toluene	0.2		D		1
Trichloroethylene	0.006	0.011	B2	0.5	0.005
Xylenes (total)	2		D		10
n-Hexane (surrogate)	0.06		D		
Semivolatile Organic Compounds					
Acenaphthene	0.06		D		
Anthracene	0.3		D		
Benzo(a)anthracene		0.73	B2		
Benzo(a)pyrene		7.3	B2		0.002
Benzo(b)fluoranthene		0.73	B2		
Benzo(ghi)perylene	(see naphthalene)		D		
Benzo(k)fluoranthene		0.073	B2		
Bis(2-ethylhexyl)phthalate	0.02	0.014	B2		0.006

TABLE 8-1

Toxicological and Regulatory Data for Detected Compounds and Surrogates
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Reference Dose-oral (mg/kg/day)	Carcinogenic Slope Factor-oral (mg/kg/day)^-1	Carcinogenic Class	TCLP (mg/l) Limit	MCL (mg/l)
Carbazole		0.02	B2		
Chrysene		0.0073	B2		
Dibenz(a,h)anthracene		7.3	B2		
Dibenzofuran	(see naphthalene)		D		
1,2-Dichlorobenzene	0.09		D		0.6
1,3-Dichlorobenzene	(see 1,2-dichlorobenzene)		D		0.6
1,4-Dichlorobenzene	0.23	0.024	B2	7.5	0.075
2,4-Dichlorophenol	0.003		D		
Fluoranthene	0.04		D		
Fluorene	0.04		D		
2-Methylnaphthalene	(see naphthalene)		D		
4-Methylphenol	0.005		D	200	
Indeno(1,2,3-cd)pyrene		0.73	B2		
Naphthalene	0.04		D		
Phenanthrene	(see naphthalene)		D		
Pyrene	0.03		D		
1,2,4-Trichlorobenzene	0.01		D		0.07
Di-n-octyl phthalate	0.02		D		

A = known human carcinogen
B2 = probable human carcinogen, sufficient evidence in animals and equate data in humans
D = inadequate evidence to classify
TCLP = toxicity characteristic leaching procedure
MCL = maximum contaminant level (May 1995)
mg/kg/day = milligrams per kilogram per day
mg/l = milligrams per liter

standard. The numeric TCLP value [in milligrams per liter (mg/l)] was used as the remediation standard (in mg/kg) without any unit conversion; a unit conversion factor [i.e., 1,000 micrograms per milligram (µg/mg)] was used to convert the remediation standard from mg/kg to µg/kg.

- In the absence of a TCLP standard, MCLs were used as the basis for deriving ground water protection standards. MCLs were multiplied by 100, consistent with the methodology used to derive TCLP standards; as described above, no conversion factor was used to convert the modified MCL (in mg/l) to a soil standard (mg/kg), although the mg/kg value was converted to a concentration in µg/kg using a factor of 1,000 (i.e., 1,000 µg/mg).

- For constituents where neither a TCLP standard nor an MCL was available, a drinking water equivalency level was developed, following the methodology for deriving ground water standards given in Subpart S of the RCRA Corrective Action Proposed Rule (July 1990). These calculated levels incorporated current toxicity data from the sources listed above. Calculated ground water standards were then multiplied by 100 to derive a soil remediation standard protective of ground water.

Where toxicity data were not available for a specific constituent, a surrogate compound was selected, and toxicity data for the surrogate compound were used to derive a remediation goal. Selection of the surrogate compound was based on structure and activity of both the surrogate and the compound for which no toxicity data were available. Table 8-2 summarizes the remediation goal calculations for NVANG soils.

It should be noted that the methodologies used to establish potential remediation standards represent conservative approaches, both to the evaluation of direct contact exposures and to the assessment of potential soil impacts on ground water quality. Calculation of remediation standards protective of direct contact exposures is predicated on the assumption that the site is developed for residential purposes, and that there is frequent and routine direct contact with soils. Remediation standards developed for protection of ground water are based on a similarly conservative approach, in which it is assumed that ground water is used for a drinking water supply, and that constituents migrate easily through subsurface soils. In reality, the migration of many of the constituents detected at this site (in

TABLE 8-2

Summary of Cleanup Level Calculations for Soil
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Concentrations in micrograms per kilogram											
	Site 7 RI Data	Site 7 SI Data	Site 5 RI Data	Site 5 SI Data	Site 4 RI Data	Site 4 SI Data	Site 14 RI Data	Site 14 SI Data	Cleanup Level (based on Subpart S)	Cleanup Level (Ground Water Protection)	Method (Ground Water Protection)	Chemical Surrogate
Volatile Organic Compounds												
Acetone	547	120	277	1,900	1,910	1,800	383		8,000,000	350,000	Subpart S x 100	
Benzene	2,800	670			79	5			24,000	500	TCLP	
2-Butanone		1,300			1,160			11	48,000,000	200,000	TCLP	
Chlorobenzene					2,350				1,600,000	100,000	TCLP	
Chloroform	12	4		2		2		2	120,000	6,000	TCLP	
Ethylbenzene	37,900	24,000	211	1,800	3,400	1,300			8,000,000	70,000	MCL x 100	
2-Hexanone							32		400,000	17,500	Subpart S x 100	n-hexane/12
Methylene Chloride	34			4,200		1,900	62	5,300	93,000	500	MCL x 100	
4-Methyl-2-Pentanone			41				18		6,400,000	280,000	Subpart S x 100	
Tetrachloroethylene					35			3	14,000	500	MCL x 100	
Toluene	20,100	3,900	255		120				16,000,000	100,000	MCL x 100	
Trichloroethylene	2		24						64,000	500	TCLP	
Xylenes (total)	258,000	82,000	2,040	9,700	12,000	4,600	2,300	2,500	160,000,000	1,000,000	MCL x 100	
Semivolatile Organic Compounds												
Acenaphthene	190	1,300						210	4,800,000	210,000	Subpart S x 100	
Anthracene	810	2,000							24,000,000	1,050,000	Subpart S x 100	
Benzo(a)anthracene	2,900	5,200		52					960	200	MCL x 100	benzo(a)pyrene
Benzo(a)pyrene	2,500	5,600		52					96	200	MCL x 100	
Benzo(b)fluoranthene	4,000	9,000		96					960	200	MCL x 100	benzo(a)pyrene
Benzo(g,h,i)perylene	1,000	2,600		88					3,200,000	140,000	Subpart S x 100	naphthalene
Benzo(k)fluoranthene	2,300	90,000		96					9,590	200	MCL x 100	benzo(a)pyrene
bis(2-Ethylhexyl)phthalate	50	380		500	461	590		210	50,000	600	MCL x 100	
Carbazole	900	1,700							35,000	180	Subpart S x 100	
Chrysene	3,400	6,300		48					96,000	480	Subpart S x 100	
Dibenzo(a,h)anthracene	520			41					96	200	MCL x 100	benzo(a)pyrene
Dibenzofuran	290	48						210	320,000	14,000	Subpart S x 100	naphthalene
1,2-Dichlorobenzene					22,500				7,200,000	60,000	MCL x 100	
1,3-Dichlorobenzene					8,320				7,200,000	60,000	MCL x 100	1,2-dichlorobenzene
1,4-Dichlorobenzene					8,960				29,000	7,500	TCLP	
2,4-Dichlorophenol		210			240				240,000	11,000	Subpart S x 100	
Fluoranthene	5,300	13,000		96					3,200,000	140,000	Subpart S x 100	
Fluorene	270	1,000		110					3,200,000	140,000	Subpart S x 100	
2-Methylnaphthalene	4,290	20,000		3,300	728	1,200	4,010	28,000	3,200,000	140,000	Subpart S x 100	naphthalene
4-Methylphenol		20			714				400,000	200,000	TCLP	
Indeno(1,2,3-cd)pyrene	1,300	2,700		39					960	200	MCL x 100	benzo(a)pyrene
Naphthalene	1,540	13,000		2,400	536		4,750	16,000	3,200,000	140,000	Subpart S x 100	
Phenanthrene	4,800	11,000		58					3,200,000	140,000	Subpart S x 100	naphthalene
Pyrene	9,900	16,000		73					7,400,000	110,000	Subpart S x 100	
1,2,4-Trichlorobenzene				6,474	10,500	210			800,000	7,000	MCL x 100	
	Concentrations in milligrams per kilogram											
JP-4 (TPH)	5,520	2,500	288	2,166	1,400	3,800	3,800	4,809	4,800	210	Subpart S x 100	n-hexane

RI = Remedial Investigation
SI = Site Investigation
MCL = maximum contaminant level
TPH = total petroleum hydrocarbons
TCLP = toxicity characteristic leaching procedure

particular, the polynuclear aromatic hydrocarbons or PAHs) will be limited because of their low solubility and their tendency to sorb to soils.

8.2 Potential Ground Water Remediation Standards

Consistent with NDEP guidance, potential remediation standards for ground water were based primarily on federal MCLs promulgated for drinking water under the Safe Drinking Water Act. Where MCLs were not available for a specific constituent, a drinking water equivalency level was derived following the methodology set forth in Subpart S of the RCRA Corrective Action Proposed Rule (EPA, July 1990). No federal or state regulatory standard is available for TPH on ground water. Calculated remediation standards for ground water were based on current toxicity data listed in IRIS (EPA, July 1995) and the summary of preliminary remediation goals prepared by EPA/Region IX (1995). Table 8-3 summarizes the remediation goal calculations for NVANG ground water.

8.3 Risk Evaluation

The following subsections summarize risk evaluation for the four IRP sites investigated during the RI. The evaluation includes a summary of source area(s) for contaminants, environmental fate of contaminants, and potential receptors.

8.3.1 Site 4 - Former FTA

Contaminants identified in Site 4 - Former FTA soils include TPH and the petroleum components 1,2,4-trichlorobenzene and 1,4-dichlorobenzene. The source area for these contaminants is well defined and is limited to a zone from approximately 5 to 8 feet bgs (Figure 5-14).

Contaminants identified in Site 4 - Former FTA ground water include TCE and benzene. These contaminants occur in ground water only in the immediate vicinity of monitoring well MW05 (Figures 5-13 and 5-13A). TCE was not detected in soil samples collected during either the SI or the RI field activities. Benzene was detected in only one SI soil sample at a concentration less than its cleanup level for ground water protection.

TABLE 8-3

Summary of Clean-up Level Calculations for Ground Water
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

	Maximum Concentrations of Organic Compounds (All concentrations in micrograms per liter)					
	Site 7 RI Data	Site 5 RI Data	Site 4 RI Data	Site 14 RI Data	Federal MCL	Subpart S (calculated)
V atile Organic Compounds						
Benzene	1,300	14	23		5	
Chlorobenzene (monochlorobenzene)			2.4		100	
Toluene	2,000	3	50		1,000	
Ethylbenzene	370	20	150		700	
Xylenes (total)	1,500	20	690		10,000	
Trichloroethylene			12		5	
Semivolatile Organic Compounds						
bis(2-Ethylhexyl)phthalate	1,700		2		6	
1,2-Dichlorobenzene (o-)			13		600	
1,3-Dichlorobenzene (m-)			4.1		600	
1,4-Dichlorobenzene (p-)			5.3		75	
2,4-Dimethylphenol	12				NA	700
2-Methylnaphthalene	63				NA	1,400
Naphthalene	53		16		NA	1,400
Phenananthrene	10				NA	1,400
Di-n-octyl phthalate	36				NA	700

1. Maximum Contaminant Levels (MCLs) and Health Advisories are based on information contained in Drinking Water Regulations and Health Advisories (EPA/Office of Water, May 1995).
2. NA - MCL not available
3. Subpart S concentrations have been calculated following the methodology outlined in the Proposed Corrective Action Rule (EPA, 1991). Calculated concentrations are based on current toxicity indices listed in Region IX Preliminary Remediation Goals/Second Half 1995, S. Smucker, Ph.D.

RI = Remedial Investigation

As discussed in Section 7, petroleum hydrocarbons and associated compounds (benzene, 1,2,4-trichlorobenzene, and 1,4-dichlorobenzene) can be biodegraded in soils and ground water. By contrast, TCE generally has a higher degree of persistence in ground water. The primary potential transport pathways for contaminant movement at Site 4 - Former FTA are leaching of soil contaminants to ground water and transport of contaminants downgradient of the source area via ground water flow.

The ground surface above the defined areas for soil and ground water contamination at Site 4 - Former FTA is comprised of bare ground and grass associated with a recreational field at the site. Exposure of potential receptors to contaminated soil at Site 4 - Former FTA is unlikely under current conditions because the area of soil contamination lies 5 to 8 feet bgs.

Exposure of potential receptors to existing ground water contaminants at the site is also unlikely. Samples collected from monitoring wells located approximately 60 feet downgradient of the area of ground water contamination did not contain benzene or TCE at concentrations greater than cleanup levels. The area of TCE and benzene contamination is located completely within the NVANG Base boundary. The closest public supply wells are located outside of the Base, approximately one-half mile from Site 4 - Former FTA.

8.3.2 Site 5 - Former FTA

TPH was the only contaminant identified in Site 5 - Former FTA soils. The source areas for TPH are well defined and appear to comprise discontinuous soil horizons at 2 feet bgs at RI soil boring SB5-2 and 6 feet bgs at SI soil boring BH6 (Figure 5-20).

Benzene is the only contaminant identified in Site 5 - Former FTA ground water. Benzene occurs in ground water at concentrations greater than the cleanup level only in the immediate vicinity of monitoring well MW17 (Figure 5-21). Benzene was not detected in any of the soil samples collected from SI and RI borings.

Petroleum hydrocarbons and benzene can be biodegraded in soils and ground water. The primary potential transport pathways for contaminant movement at Site 5 - Former FTA are leaching of soil contaminants to ground water and transport of contaminants downgradient of the source area via ground water flow.

The ground surface above the defined areas for soil and ground water contamination at Site 5 - Former FTA is comprised of bare ground and

with a native grass vegetated surface. Approximately one-half of the area of soil contamination lies outside the existing boundary of the NVANG Base. It is estimated that a portion of the area of ground water contamination may lie off Base. Exposure of potential receptors to contaminated soil at Site 5 - Former FTA is unlikely under current conditions because the area of soil contamination lies 2 to 6 feet bgs.

Exposure of potential receptors to benzene in ground water at the site is also unlikely. Samples collected from monitoring well MW30, located approximately 60 feet downgradient of the area of ground water contamination, did not contain detectable concentrations of benzene. The majority of the area of benzene contamination is within the NVANG Base boundary. A portion of the area may lie outside the Base boundary. The closest public supply wells are located outside of the Base, approximately one-half mile from Site 5 - Former FTA.

8.3.3 Site 7 - POL Storage Area

TPH, benzene, toluene, and PAHs were identified as contaminants in soils at Site 7 - POL Storage Area. The source areas for the individual contaminants is complex; however, three distinct source areas can be identified for overall soil contamination at the site (Figure 5-30). Soil contamination was identified at Site 7 - POL Storage Area from approximately 2 to 7.5 feet bgs.

Areas of floating pure product for fuel hydrocarbons have been identified at Site 7 - POL Storage Area. Benzene is the primary dissolved phase contaminant identified in ground water at this site. Benzene occurs in ground water at concentrations greater than the cleanup level in the eastern half of the IRP site. Secondary contaminants, bis(2-ethylhexyl)phthalate and toluene, were also identified at the site. The area of ground water contamination for these compounds lies within the larger area of benzene contamination (Figure 5-31).

Petroleum hydrocarbons and its components can be biodegraded in soils and ground water. The primary potential transport pathways for contaminant movement at Site 7 - POL Storage Area are leaching of soil contaminants to ground water and transport of contaminants downgradient of the source area via ground water flow.

The ground surface above the defined areas for soil and ground water contamination at Site 7 - POL Storage Area is comprised primarily of asphaltic concrete. Two areas of bare ground exists at the site: an approximate 7-foot wide strip along the fence line in southern portion

of the area; and an approximate 30-foot wide strip along the western boundary of the site.

It is estimated that a small portion of the area of soil contamination may lie off Base (Figure 5-30). Exposure of potential receptors to contaminated soil at Site 7 - POL Storage Area is unlikely under surface current conditions because the area of soil contamination lies 2 to 7 feet bgs.

Exposure of potential receptors to benzene, toluene or bis(2-ethylhexyl)phthalate in ground water at the site is also unlikely. Samples collected from monitoring wells MW23 and MW31, located 100 feet downgradient of the USTs did not contain detectable concentrations of these compounds. The majority of the area of ground water contamination is within the NVANG Base boundary. The closest public supply wells are located outside of the Base, approximately one-half mile from Site 7 - POL Storage Area.

8.3.4 Site 14 - OWS

TPH was the only contaminant identified in Site 14 - OWS soils. The source area for TPH is well defined and appears to occur in zone 5 to 8 feet bgs (Figure 5-35). No ground water contamination has been identified at this site.

As discussed in Section 7, petroleum hydrocarbon compounds can be biodegraded in soils. The primary potential transport pathways for contaminant movement from soils at Site 14 - OWS is leaching of soil contaminants to ground water. Based on the review of ground water data collected during the SI and RI, leaching does not appear to be a significant transport pathway at this site.

The ground surface above the defined areas for soil contamination at Site 14 - OWS is comprised of soil covered with a cobble/gravel surface. Exposure of potential receptors to contaminated soil at Site 5 - Former FTA is unlikely under current conditions because the area of soil contamination lies 5 to 8 feet bgs.

SECTION 9.0

CONCLUSIONS

The following section provides a brief summary of conclusions based on RI field activities at IRP Sites 4, 5, 7, and 14.

9.1 Site 4 - Former FTA

An area of soil was identified in which TPH, 1,2,4-TCB, and 1,4-DCB exceeded cleanup goals. In general, this area is relatively small and is in the immediate vicinity of soil borings SB4-5 and BH14. This area is located immediately upgradient from monitoring well MW05 and potentially provides a continuing source of petroleum-derived hydrocarbons and VOCs to Site 4 - Former FTA ground water.

An area of ground water was identified that contained TCE and benzene concentrations equal to or exceeding their respective cleanup standards. This area is confined to the immediate vicinity of monitoring well MW05. Comparison of concentrations of these compounds in samples collected in March 1992 and July 1995 suggest that significant decreases have occurred.

9.2 Site 5 - Former FTA

An area of TPH-impacted soil was identified in the immediate vicinity of monitoring well MW17. The impacted soil provides a continuing source of petroleum-derived hydrocarbons to Site 5 - Former FTA ground water. This soil area lies partially on Airport property and partially on the NVANG Base.

Benzene exceeds cleanup standards in ground water samples collected from monitoring well MW17. Review of additional data for Site 5 - Former FTA suggests that benzene-impacted ground water is confined to the immediate vicinity of monitoring well MW17. A portion of this area of benzene-impacted ground water probably extends off Base. A comparison of concentrations of these compounds in samples collected in March 1992 and May 1995 suggests that no significant changes have occurred.

9.3 Site 7 - POL Storage Area

Approximately 13,500 gallons of floating product existed within the UST excavation area as of mid-August 1995. This estimate was based on data collected during product removal operations in late-August 1995. The floating product was discovered during RI investigations at Site 7 - POL Storage Area. The product is within the gravel backfill in the UST excavation area. Geologic conditions surrounding the UST excavation area have resulted in minimizing the migration of floating product from the excavation. Product removal operations were implemented during a ten-day period, August 23 through September 7, 1995. During this period, approximately 10,000 gallons of product was removed from the gravel backfill.

One additional area of free product exists at Site 7 - POL Storage Area in the vicinity of product monitoring well T-4. This discrete area of floating product is likely associated with a surface spill event.

A relatively large area of JP-4 impacted soil was identified. Review of the areal and vertical distributions of TPH, benzene, toluene, and other fuel component compounds (i.e., PAHs) suggests that the complex distribution of impacted soil is consistent with the product release history at Site 7 - POL Storage Area. Several JP-4 spills have occurred in the Site 7 - POL Storage Area, most of which are reported to have been flushed into soil and gravel areas surrounding the refueling stand. The presence of fuel hydrocarbons in the soil has impacted ground water quality at Site 7 - POL Storage Area.

An area of ground water was identified that contained benzene, toluene, and bis(2-ethylhexyl)phthalate exceeding their respective cleanup standards. Although bis(2-ethylhexyl)phthalate is known as a common laboratory contaminant, no information is available to suggest that laboratory contamination is responsible for detection of this compound in Site 7 - POL Storage Area ground water samples.

The area of ground water impacted by benzene comprises the eastern half of Site 7 - POL Storage Area. This area may actually extend off Base in the vicinity of the Airport's control tower. However, it is not anticipated that the benzene-impacted ground water extends a significant distance south of the Base fence line, based on review of the on-Base benzene distribution. The area of ground water impacted by bis(2-ethylhexyl)phthalate is confined to the immediate vicinity of monitoring wells MW07, MW25, and product monitoring well T-4. The area of ground water impacted by toluene is confined to the immediate vicinity of product monitoring well T-4.

9.4 Site 14 - OWS

TPH in soils exceed cleanup standards in an area of soil at Site 14 - OWS. The distribution of the TPH-impacted soil is consistent with the release history at Site 14 - OWS. The absence of significant VOCs in the impacted areas suggests that in situ degradation of the spilled fuel has occurred. The remaining semivolatile components of JP-4 fuel have low solubility, inhibiting their transport to ground water.

It does not appear that TPH-impacted soils currently provide a significant source of fuel-related hydrocarbons to ground water. Ground water data collected during the SI and the RI suggest that minor concentrations of fuel-related hydrocarbons have been transported to ground water.

SECTION 10.0

RECOMMENDATIONS

The following summarizes recommendations based on review of RI and SI data for the NVANG Base.

10.1 Site 4 - Former FTA

- An FS should be performed for Site 4 - Former FTA soils to evaluate remedial alternatives for soil containing TPH, 1,2,4-TCB, and 1,4-DCB. The FS should evaluate various alternatives to eliminate the source of these contaminants from soil to prevent transport to ground water.

- Long-term ground water monitoring should be performed at Site 4 - Former FTA, based on the limited extent of ground water affected and based on the current declining concentration trend for TCE and benzene.

10.2 Site 5 - Former FTA

- An FS should be performed for Site 5 - Former FTA to evaluate remedial alternatives for ground water containing benzene. The FS should evaluate various alternatives to eliminate or mitigate transport downgradient transport.

- An FS should be performed for Site 5 - Former FTA soils to evaluate remedial alternatives for soils containing petroleum hydrocarbons, a portion of which lies off Base. The FS should evaluate alternatives to eliminate or mitigate the potential threat to ground water quality.

10.3 Site 7 - POL Storage Area

- An FS should be performed for the remaining free product in the excavation backfill based on the potential threat posed by this source

of petroleum hydrocarbons to Site 7 - POL Storage Area ground water.

- A periodic product thickness monitoring program and mitigation by bailing should be instituted at product monitoring well T-4. A similar program was successful in significantly reducing free product thickness at monitoring well MW07.

- An FS should be performed for Site 7 - POL Storage Area to evaluate remedial alternatives for soils containing petroleum hydrocarbons, a portion of which lies off Base. The FS should evaluate alternatives to eliminate or mitigate the potential threat to ground water quality.

- An FS should be performed for Site 7 - POL Storage Area to evaluate remedial alternatives for ground water containing benzene, toluene, and bis(2-ethylhexyl) phthalate. A portion of the area of ground water containing elevated concentrations of benzene lies off Base. The FS should evaluate various alternatives to eliminate or mitigate downgradient transport.

10.4 Site 14 - OWS

- Long-term monitoring should be performed for Site 14 - OWS ground water to detect the possibility of future problems.

SECTION 11.0

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APPENDIX A

TECHNICAL MEMORANDA FOR FIELD ACTIVITIES

FILE COPY

Memorandum

To: Robin Weesner

From: Nevine Melikian, ERM-West.

Subject: Ground Water Monitoring, NVANG, May 11, 1995

Date: May 1, 1995

This document outlines the details of ground water sampling on May 11 through May 14, 1995 and on May 24, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. On May 11 through May 14, ground water will be sampled at 17 existing monitoring wells. On May 24, ground water will be sampled at 4 new monitoring wells installed by ERM in the period between May 15 and May 23, 1995. The locations of all monitoring wells to be sampled are shown in attached figure. The intallation and sampling of 6 additional optional monitoring wells may be required.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Steve Becker, the Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Sampling Procedures

A two day waiting period is required between well development and ground water sampling at the newly installed monitoring wells.

Prior to purging each monitoring well, ground water levels will be measured using an electric water level meter. Ground water level and all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, Sp. condition, and temperature) will be recorded on Ground Water monitoring forms. Well volume

information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

If present, floating product thickness in monitoring wells MW25 and MW07 will be recorded. If the thickness is measurable, floating product will be removed using a non disposable bailer. Monitoring wells MW25 and MW07 will be sampled last.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

May 11, 1995:	MW15, MW18, MW16, MW17
May 12, 1995:	MW19, MW08, MW27, MW26, MW24
May 13, 1995:	MW23, MW03, MW04, MW05
May 14, 1995:	MW10, MW06, MW25, MW07
May 24, 1995:	MW28, MW29, MW30, MW31

This schedule may be altered due to site operations and/or sampling speed.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the second sampling round). For example, MW03-95-2 represent a ground water sample collected during the second round of quarterly sampling in 1995 from monitoring well MW03.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;

- Semi-volatile organic compounds (SVOCs) using EPA Method 3550/8270;
- Total petroleum hydrocarbons (TPH) using EPA Method 5030/8015; and
- Lead using EPA Method 3050/7420.

Ground water analyses will be performed by Gulf States Analytical (GSA). Ground Water Samples will be shipped by Federal Express to GSA:

Gulf States Analytical
Att: Lora Dunlap
6310 Rothway
Houston, Texas 77040-9835
(713) 690-4444

A validation package will be requested from GSA for ground water samples collected from monitoring well MW23 and MW05, and MW31, therefore, a separate Chain-of-Custody form will be prepared for MW23, MW05 and MW31. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

Duplicate Samples. Field duplicates will be collected at a frequency of 10 % of total number of original samples. Duplicate ground water samples will be collected from monitoring wells MW18, MW06, and MW28. Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

Trip Blanks. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB051995-1 represents the first trip blank collected on May 19, 1995.

MS/MSD. One MS/MSD will be designated for every 20 ground water samples. MS/MSD will be requested for the sample collected from monitoring well MW27 and MW30. This should be indicated on the Chain-of-Custody form.

Field Blanks. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Equipment Rinsate. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, a rinse with ASTM Type I reagent water and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sampling program:

Analysis	Method	Container	Sampling Locations	Field QA/QC					Total Samples
				Field Dup	MS/MS D	Equip Rinse	Trip Blank	Field Blank	
VOCs	8010/8020	2 X 40 ml glass	21	3	2	3	5	3	37
SVOCS	8270	2 X 1-liter glass	21	3	2	3	-	3	32
TPH	8015	2 X 40 ml glass	21	3	2	3	-	3	32
Lead	7420	250 ml plastic	21	3	2	3	-	3	32

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Bett:

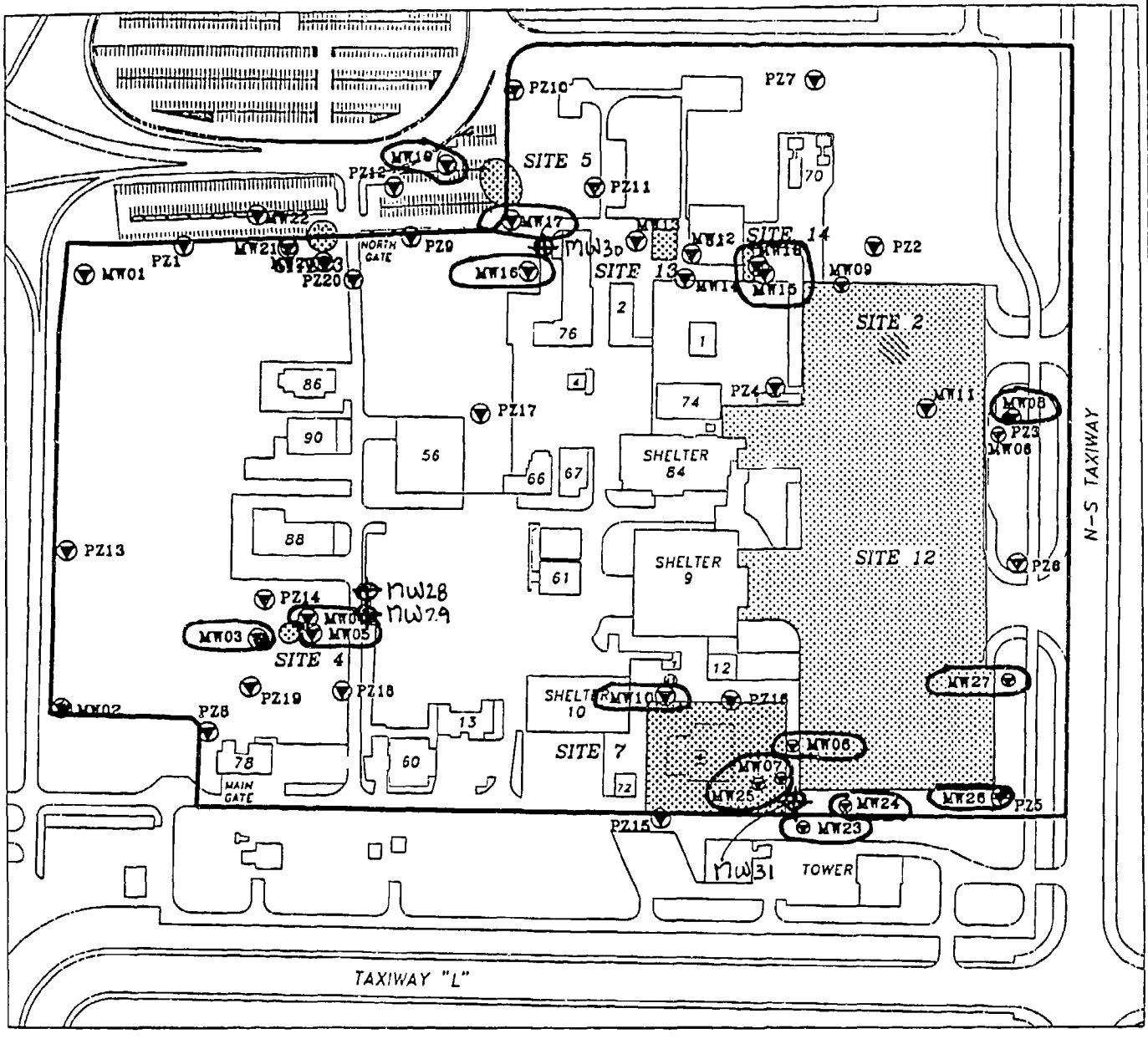
- 2-inch submersible pump, controller, and real
- Water level meter
- Photoionization detector (PID)
- Interface probe
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Non-disposable bailer
- ASTM Type I reagent water
- Alconox or Liqui-Nox
- Aluminum foil

Arizona Office Responsibility:

- Pesticide grade methanol
- Sampling bottles and coolers
- Ground water monitoring data forms
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan

NVANG Well Volume Information

Date of Measurement	Well Number	Casing Elevation (ft)	Head Elevation (ft) 9/94	Depth to Water (ft below measuring point)	Casing Depth (ft)	Saturated Interval (ft)	3 Casing Volumes (gal)
1/95	MW06	4398.69	4394.04	4.65	14.5	9.85	4.82
	MW07	4397.90	4393.80	4.1	14.0	9.9	4.85
	MW08	4399.21	4394.11	5.1	14.0	8.9	4.36
	MW23	4399.40	4393.62	5.78	15.0	9.22	4.51
	MW24	4398.67	4393.47	5.2	15.0	9.8	4.80
	MW25	4397.78	4393.70	4.08	13.0	8.92	4.37
	MW26	4397.32	4392.71	4.61	15.0	10.39	5.09
	MW27	4397.32	4394.16	3.16	15.0	11.84	5.80
3/93	MW03	4404.38	4396.84	7.54	16.0	8.46	4.14
	MW04	4403.69	4396.30	7.39	16.0	8.61	4.21
	MW05	4403.61	4396.36	7.25	11.0	3.75	1.84
	MW10	4400.79	4394.80	5.99	13.0	7.01	3.43
	MW15	4402.77	4395.27	7.50	13.5	6.00	2.94
	MW16	4404.17	4395.54	8.63	16.5	7.87	3.85
	MW17	4402.50	4395.64	6.86	14.0	7.14	3.50
	MW18	4402.57	4395.51	7.25	14.5	7.25	3.54
	MW19	4404.11	4395.82	8.29	16.5	8.21	4.02



Original IRP Site

Base Boundary

Existing Monitoring Wells to be sampled

Approximate locations of monitoring wells to be installed and sample

FEET
0 75 150 300
0 15 30 60 90
METERS

N.

FIGURE 2-1

LOCATION OF SITES

2, 3, 4, 5, 7, 12, 13, AND 14

F:\HOME\PATTY\RENO\RENOAM58.dwg

ERM

22 FEBRUARY 1995

FILE COPY

Memorandum

To: Robin Weesner

From: Nevine Melikian, ERM-West.

Subject: Soil Sampling, NVANG, May 15, 1995

Date: May 2, 1995

This document outlines the details of soil sampling on May 15 through May 23, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. Soil samples will be collected from 24 soil boring at four sites (Sites 4, 5, 7, and 14) at the NVANG Base. The locations of the proposed soil borings are shown in attached figures. Optional borehole drilling (maximum 10 soil borings) and soil sampling may be required.

The purpose of soil sampling at 22 of the soil borings is to delineate the horizontal and vertical extent of soil contamination at the investigation sites. The remaining two soil borings are for the purpose of aiding in the design of a free product recovery system at Site 7.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Steve Becker, the Site Safety Officer, will ensure that all personnel present during fieldwork fill out the daily tailgate forms.

Soil Sampling Procedures

Borehole logging/sampling forms to be used during this investigation are attached to this memo. Once equipment decontamination procedures have been met, continuous drive samples will be collected using a 2-foot split-spoon sampler equipped with brass sampling sleeves.

Continuous drive samples will be collected from the interval between land surface to the target depth. All soil samples will be collected in the unsaturated zone. The thickness of the unsaturated zone will be determined based on geologic conditions and on ground water level

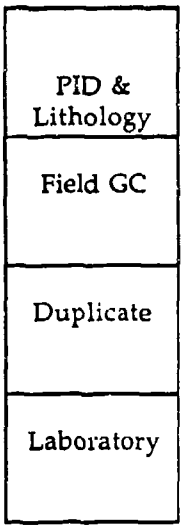
measurements conducted at nearby monitoring wells during ground water monitoring activities. Confined conditioned exist at some locations at the NVANG. Where unconfined or water table conditions occur, soil borings will be terminated at the top of the water table. Where confined ground water conditions occur, the soil borings will be terminated at the bottom of the confining layer. It is anticipated that the maximum total depth of the soil borings will be approximately 10 feet below ground surface (bgs).

Samples collected from each drive sample interval will be field-screened using a PID and a portable field GC. Three samples from each soil boring, with the highest contamination levels as determined by field screening, will be submitted for laboratory analysis. If the results of the field screening do not clearly target a specific interval for laboratory analysis, samples collected from immediately below the surface fill material, from the middle of the borehole, and from the bottom of the borehole will be submitted for laboratory analysis.

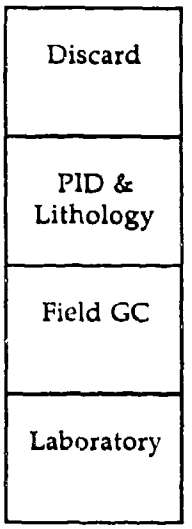
The following figure shows the sampling scheme for the drive sampler. From each drive sample, the bottom-most sleeve will be submitted for laboratory analysis, and if applicable, the third sleeve from the top will be submitted as a field duplicate. If no duplicated sample is to be collected, the third sleeve from the top will be used for screening using the field GC, the second sleeve from the top will be used for litho-logging and for screening using a PID, and the top sleeve will be discarded. If a duplicated sample is to be collected, the second sleeve from the top will be used for screening using the field GC and the bottom half of the top sleeve will be used for litho-logging and for screening using the PID.

Drive Sampler Sampling Scheme

If a Duplicate Sample will be Collected



If no Duplicate Sample will be Collected



The ends of the brass sleeves for soil samples to be sent for laboratory analysis and for field GC screening will be covered with Teflon and with fitted plastic caps. Samples will then be labeled, placed in individual Gladlock bags, and stored on ice. Sample labels provided by the laboratory will be used for samples to be submitted for laboratory analysis. ERM sample labels will be used for samples to be screened using the field GC

Sampling Schedule

The following is a tentative schedule for borehole drilling and soil sampling:

May 15 and 16, 1995:	Site 4: Soil borings SB4-1, SB4-2, SB4-3, SB4-4, SB4-5, SB4-6
May 17, 18, and 19, 1995:	Site 7: Soil Borings SB7-1, SB7-2, SB7-3, SB7-4, SB7-5, SB7-6, SB7-7, SB7-8
May 20 and 21, 1995:	Site 5: Soil Borings SB5-1, SB5-2, SB5-3, SB5-4
May 22 and 23, 1995:	Site 14: Soil Borings SB14-1, SB14-2, SB14-3, SB14-4

This schedule may be altered due to site operations and/or sampling speed.

Soil Sample Identifiers

Sample identifiers for original soil samples will include the site number, soil boring number, and sample depth. For example, SB4-1-6 represents soil boring number one, at site 4, with the sample collected at 5.5 to 6 feet bgs..

Analytical Parameters

Soil samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8240;
- Semi-volatile organic compounds (SVOCs) using EPA Method 3550/8270; and
- Total petroleum hydrocarbons (TPH) using EPA Method 5030/8015 (standard JP-4 and Gas);

Soil sample analyses will be performed by Gulf States Analytical (GSA). Ground Water Samples will be shipped by Federal Express to GSA:

Gulf States Analytical
Att: Lora Dunlap
6310 Rothway
Houston, Texas 77040-9835
(713) 690-4444

A validation package will be requested from GSA for eight field selected soil samples collected on May 17 and 19, therefore, a separate Chain-of-Custody form will be prepared for each of these samples. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. Duplicate samples will be analyzed for the same parameters as the original samples. Equipment rinsate samples will be analyzed for VOCs using EPA Method 8240, SVOC using EPA Method 8270, and TPH using EPA Method 8015 (Standard JP-4 and Gas). Trip blanks will only be analyzed for VOCs using EPA Method 8240.

Duplicate Samples. Field duplicates will be collected at a frequency of 10 % of total number of original samples. Eight field selected duplicate soil samples will be collected from the following soil borings:

- Site 4: SB4-1 and SB4-4;
- Site 7: SB7-1, SB7-3, SB7-8;
- Site 5: SB5-2, SB5-4; and
- Site 14: SB14-2.

Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

Trip Blanks. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB051995-1 represents the first trip blank collected on May 19, 1995.

MS/MSD. One MS/MSD will be designated for every 20 soil samples. MS/MSD will be requested for four field selected soil samples, one soil sample collected from each of soil borings SB4-2, SB5-1, SB7-5, SB7-6 . This should be indicated on the Chain-of-Custody form.

Equipment Rinsate. Rinsate blanks from final rinse of drive sampler after decontamination will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the boring identifier at which the blank was prepared followed by an asterix.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, a rinse with ASTM Type I reagent water and pesticide-grade methanol. All equipment will be allowed to air dry, if possible, and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

the drilling rig and flights will be decontaminated after use by steam cleaning.

Sampling Summary

The following table summarizes the soil sampling program:

Matrix	Method	Container	Original Samples	Field QA/QC				Matrix Total
				Field Dup	MS/MS D	Equipment Rinsate	Trip Blank	
Soil	VOCs (8240) SVOCs (8270) TPH (8015) (Standard JP-4 & Gas)	Brass Sleeve	72	8	4			80
Water	VOCs 8240	2X40 ml glass				4	8	12
	SVOCs 8270	2X1000 ml glass				4		4
	TPH (8015) (Standard JP-4 & Gas)	2X40 ml glass				4		4

Required Equipment and Materials

- Brass sleeves
- Teflon fi'.i
- Plastic caps
- Photoionization detector (PID)
- Portable Gas Chromatograph (GC)
- Coolers
- Pesticide grade methanol
- ASTM Type I reagent water
- Alconox or Liqui-Nox
- Aluminum foil

- Borehole logging/sampling record
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan

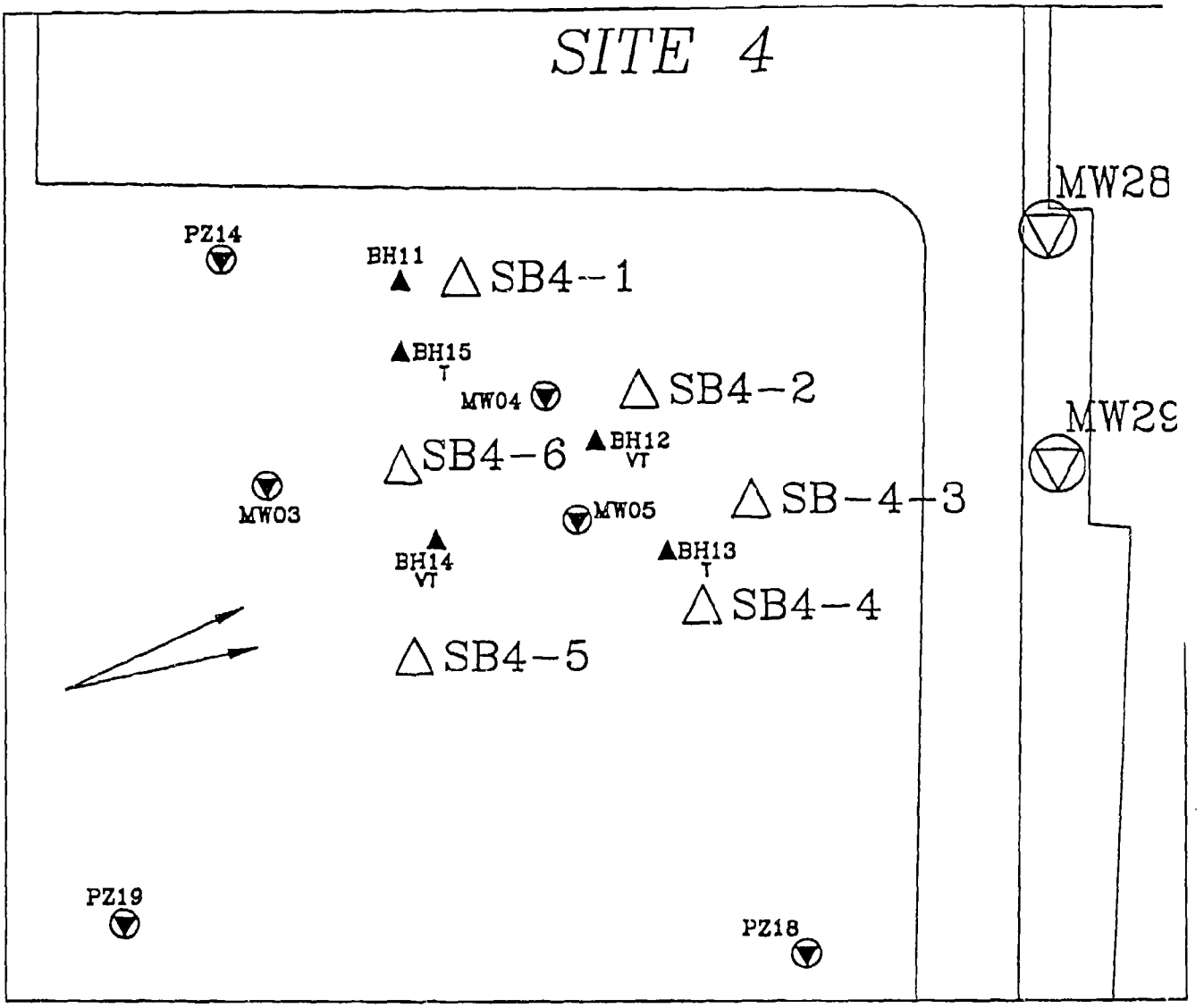


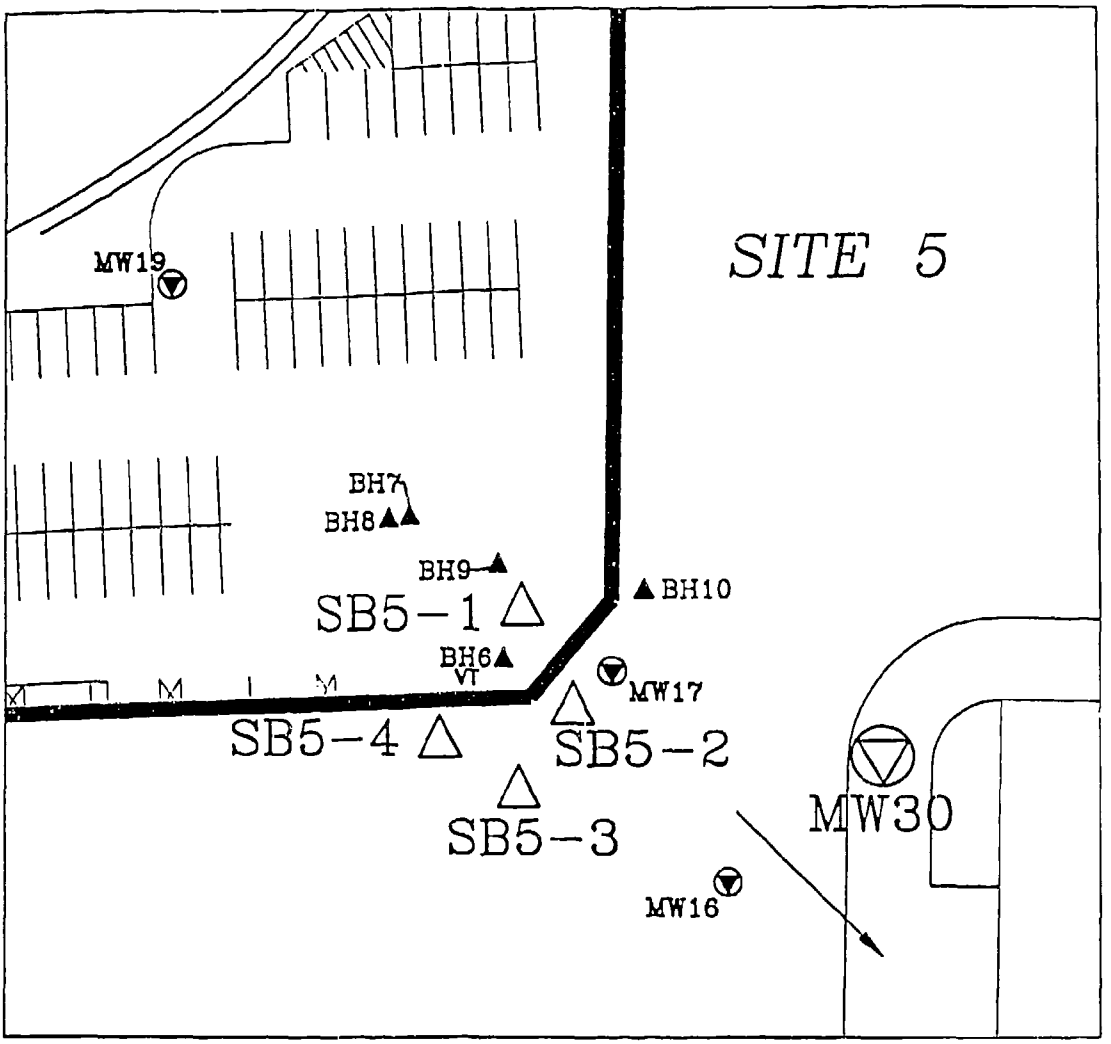
FIGURE 3-6

PROPOSED SITE 4 SOIL BORING AND MONITORING WELL LOCATIONS

3-24

ERM

22 FEBRUARY 1995



GROUND WATER FLOW DIRECTION

BASE BOUNDARY

MONITORING WELL

SOIL BORING LOCATION

PROPOSED MONITORING WELL LOCATION

PROPOSED SOIL BORING LOCATION

V VOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS

T TOTAL PETROLEUM HYDROCARBONS DETECTED ABOVE CLEANUP GOALS

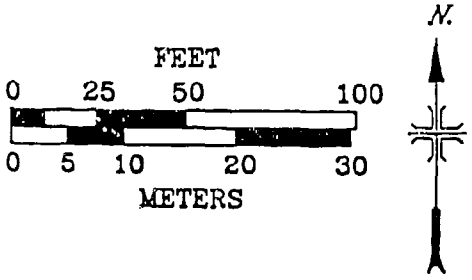


FIGURE 3-11

PROPOSED SITE 5 SOIL BORING AND MONITORING WELL LOCATIONS

3-34

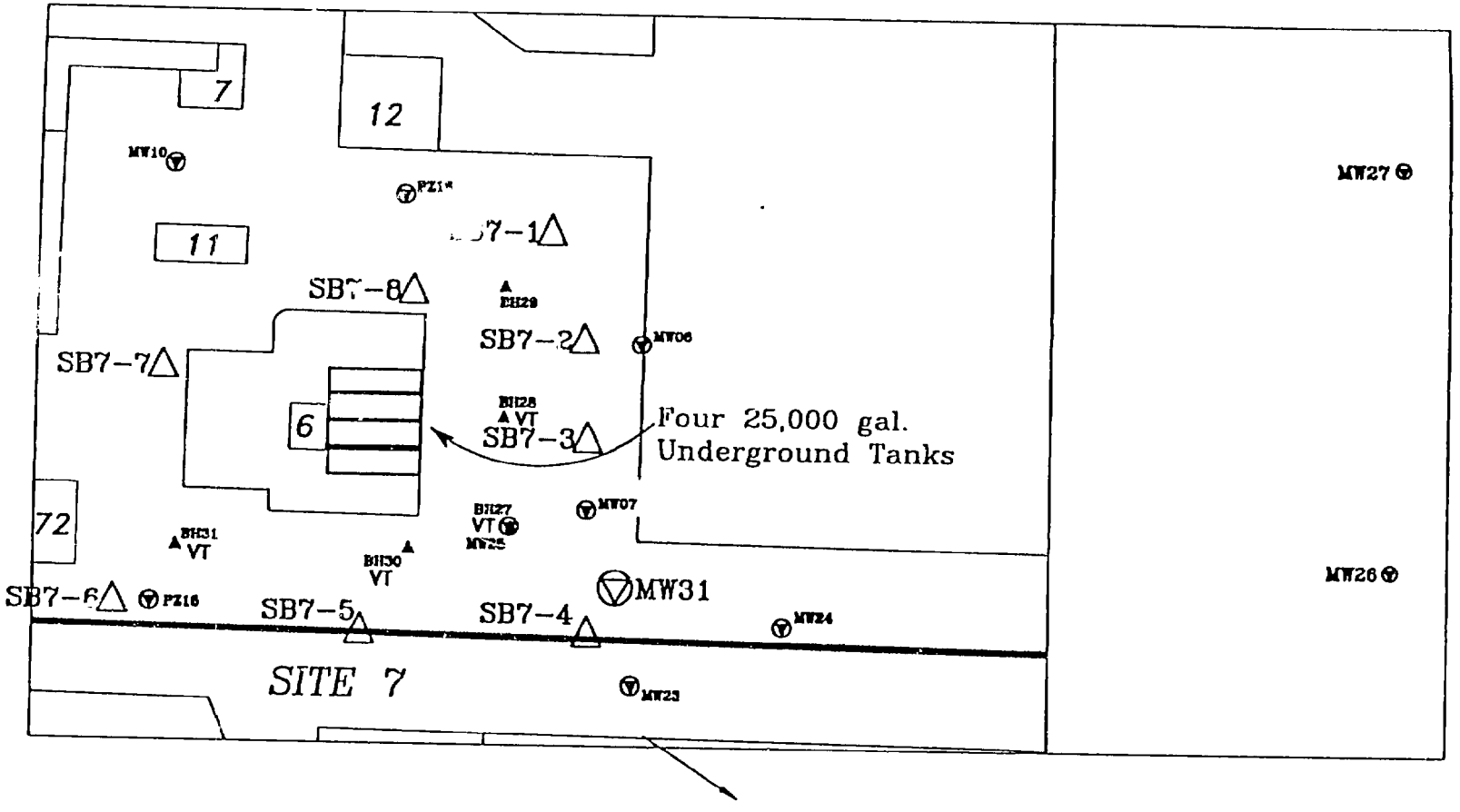
ERM

22 FEBRUARY 1995

FIGURE 3-16

PROPOSED SITE 7 SOIL BORING AND MONITORING WELL LOCATIONS

3-46



FEET
0 25 50 100
0 5 10 20 30
METERS

N.

Ground Water Flow Direction

Base Boundary

Abandoned Piezometer/Monitoring Well Location

Soil Boring Location

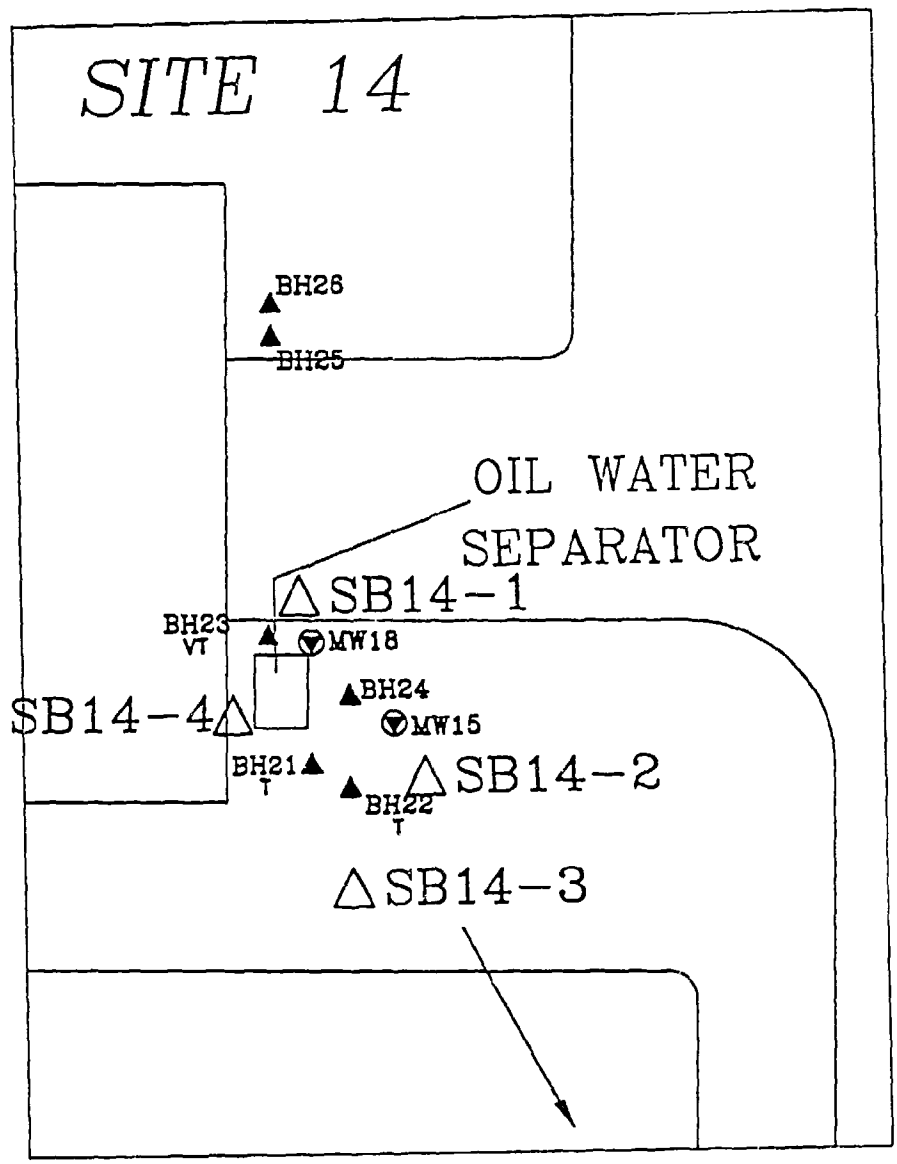
Proposed Monitoring Well Location

Proposed Soil Boring Location

V Volatile Organic Compounds Detected Above Cleanup Goals

ERM

22 FEBRUARY 1994



GROUND WATER FLOW DIRECTION

FEET

0 25 50

0 5 10

METERS

N

▲ SOIL BORING LOCATION

MONITORING WELL LOCATION

△ PROPOSED SOIL BORING LOCATION

V VOLATILE ORGANIC COMPOUNDS DETECTED ABOVE CLEANUP GOALS

T TOTAL PETROLEUM HYDROCARBONS DETECTED ABOVE CLEANUP GOALS

FIGURE 3-21

PROPOSED SITE 14

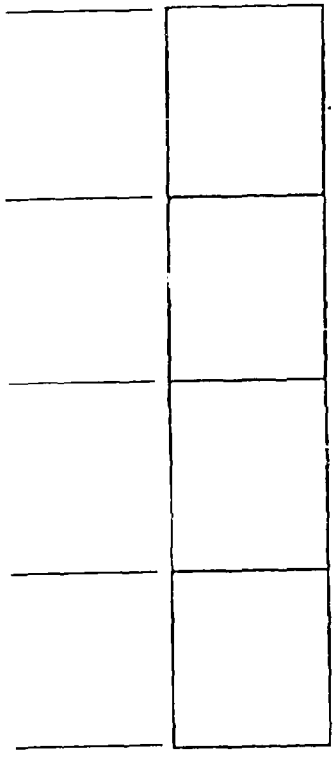
SOIL BORING LOCATIONS

3-56

ERM

22 FEBRUARY 1995

Depth, feet bgs



Drive Sampler Sampling Scheme

Borehole Logging and Sampling Form

Borehole I.D:_____.
Date:_____
Page ___ of ____
Notes By: _____:

Lithologic Information

Color:_____ Moisture Content: Dry, Slightly Moist, Moist, Very Moist, Saturated

Textural Classification:_____

Size Classes:

	% Volume	Angularity	Sizes	Plasticity
Clay	_____			_____
Silt	_____			_____
Sand	_____	_____	_____	
Gravel	_____	_____	_____	

Induration: Poor, Moderate, High
Sorting: Poor, Fair, Good, Very Good
Consistency: FG Sediment - Soft, Firm, Stiff
CG Sediment - Loose, Dense, Hard

USGS Designation:_____
Sample PID Reading:_____
Field GC Reading:_____
Odor:_____
Staining:_____
Notes:

Drive Information

Depth Interval_____ to _____feet bgs
Blows:_____
Recovery, feet:_____
Notes:

Sampling Information

Collection Time:_____
Sample Identification:_____
QA/QC Sample:_____ QA/QC Sample I.D.:_____
Laboratory: Gulf States Analytical, Inc., Houston, Texas
Analyses to be performed: VOCs (8240), SVOCs (8270), TPH (8015) std. JP-4 and Gas
Notes:

PID Air Monitoring: Ambient Air:_____ppm/time, Breathing Zone:_____ppm/time, Borehole:_____ppm/time

6001

Memorandum

FILE COPY

To: Robin Weesner

From: Nevine Melikian, ERM-West.

Subject: Ground Water Resampling, NVANG, July 12 & 13, 1995

Date: July 3, 1995

This document outlines the details of ground water resampling on July 12 and July 13, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. Ground water will be resampled at 7 existing monitoring wells. The locations of all monitoring wells to be sampled are shown in attached figures.

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). The Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Sampling Procedures

Prior to purging each monitoring well, ground water levels will be measured using an electric water level meter. Ground water level and all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, Sp. condition, and temperature) will be recorded on Ground Water monitoring forms. Well volume information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

May 12, 1995: MW04, MW05, MW28, MW29

May 13, 1995: MW32, MW30, MW24

This schedule may be altered due to site operations and/or sampling speed. MW32 is located on Reno-Tahoe Airport property. If access gate is locked, contact Mike Anderson at Airport Operations (702) 328-6490. In the case of access problems to monitoring wells located on the base, contact Major John Peck at (702) 788-4503.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the second sampling round). For example, MW03-95-2 represent a ground water sample collected during the second round of quarterly sampling in 1995 from monitoring well MW03.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;

Ground water analyses will be performed by Gulf States Analytical (GSA). Ground Water Samples will be shipped by Federal Express to GSA:

Gulf States Analytical
Att: Lora Dunlap
6310 Rothway
Houston, Texas 77040-9835
(713) 690-4444

Ship samples at the end of the sampling program; it is not necessary to ship every day. Include 48 hour turnaround time on Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

Duplicate Samples. Field duplicates will be collected at a frequency of 10 % of total number of original samples. Duplicate ground water samples will be collected from monitoring well MW29. Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

Trip Blanks. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB051995-1 represents the first trip blank collected on May 19, 1995.

MS/MSD. One MS/MSD will be designated for every 20 ground water samples. MS/MSD will be requested for the sample collected from monitoring well MW32. This should be indicated on the Chain-of-Custody form.

Field Blanks. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Equipment Rinsate. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or

Alconox), followed by a rinse with potable water, a rinse with ASTM Type I reagent water and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sampling program:

Analysis	Method	Container	Sampling Locations	Field QA/QC					Total Samples
				Field Dup	MS/MS D	Equip Rinse	Trip Blank	Field Blank	
VOCs	8010/8020	2 X 40 ml glass	7	1	1	1	2	1	12

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Betts:

- 2-inch submersible pump, controller, and real
- Water level meter
- Photoionization detector (PID)
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Non-disposable bailer
- Alconox or Liqui-Nox
- Aluminum foil
- Sampling bottles and coolers (will be shipped by the lab to Sacramento)
- ASTM Type I reagent water (available in storage shed at NVANG)
- Pesticide grade methanol (available in storage shed at NVANG)

Arizona Office Responsibility:

- Ground water monitoring data forms
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan

NVANG Well Volume Information

Date of Measurement	Well Number	Casing Elevation (ft)	Head Elevation (ft) 9/94	Depth to Water (ft below measuring point)	Casing Depth (ft)	Saturated Interval (ft)	3 Casing Volumes (gal)
May, 1995	MW04	4403.69	4397.86	5.83	16.05	10.22	30.66
	MW05	4403.61	4397.96	5.65	10.20	4.55	13.65
	MW24	4398.67	4393.92	4.75	15.10	10.35	31.05
	MW28	4404.03	4397.55	6.48	17.96	11.48	34.44
	MW29	4404.05	4397.75	6.30	18.42	12.12	36.36
	MW30	4404.48	4397.21	7.27	18.40	11.13	33.39
	MW32	4401.89	4397.21	4.68	19.05	14.37	43.11

Memorandum

To: Robin Weesner

From: Frank Lamphere, ERM-West.

Subject: Ground Water Monitoring, NVANG, August 21-25, 1995

Date: August 18, 1995

This document outlines the details of ground water sampling on August 21 through August 25, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. On August 21 through August 25, ground water will be sampled at 21 existing monitoring wells. The locations of all monitoring wells to be sampled are shown in attached figure. **All changes from procedures used during the May/July 1995 sampling round will be denoted in bold print.**

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Frank Lamphere, the Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Sampling Procedures

Prior to purging each monitoring well, ground water levels will be measured using an electric water level meter. Ground water level and all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, conductivity, and temperature) will be recorded on Ground Water monitoring forms. Well volume information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

If present, floating product thickness in monitoring wells MW25, MW07, T-1, T-2, T-3, and T-4 will be recorded. If the thickness is measurable and a sample is to be collected, floating product will be removed using a dedicated product removal disposable bailer. Monitoring wells MW25, MW07, and T-4 will be sampled last. NOTE: ground water samples will not be collected from wells T-1 through T-3.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

August 21, 1995: MW15, MW18, MW17, MW30, MW32

August 22, 1995: MW08, MW27, MW26, MW24, MW23

August 23, 1995: MW28, MW29, MW03, MW04, MW05*

August 24, 1995: MW10, MW06, MW31*

August 25, 1995: MW25, MW07, T-4

This schedule may be altered due to site operations and/or sampling speed.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the third sampling round). For example, MW03-95-3 represent a ground water sample collected during the third round of quarterly sampling in 1995 from monitoring well MW03.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;
- Semivolatile organic compounds (SVOCs) using EPA Method 3550/8270;

- **Extractable total petroleum hydrocarbons (TPH) using EPA Method 5030/8015;**

- **Purgable total petroleum hydrocarbons (TPH) using EPA Method 5030/8015; and**

- Lead using EPA Method 3050/7420.

Ground water analyses will be performed by Quanterra Analytical Services (QAS). Ground Water Samples will be shipped by Federal Express to QAS:

Quanterra Analytical Services
Att: Tracy Sidwell
1721 South Grand Ave.
Santa Ana, CA
92705
(714) 258-8610

A validation package will be requested from QAS for ground water samples collected from monitoring well MW07 and MW31 therefore, a separate Chain-of-Custody form will be prepared for MW07 and MW31. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

Duplicate Samples. Field duplicates will be collected at a frequency of 10 % of total number of original samples. Duplicate ground water samples will be collected from monitoring wells MW05 and MW31. Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

Trip Blanks. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB082195-1 represents the first trip blank collected on August 21, 1995.

MS/MSD. One MS/MSD will be designated for every 20 ground water samples. MS/MSD will be requested for the sample collected from

monitoring well MW05. This should be indicated on the Chain-of-Custody form.

Field Blanks. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Equipment Rinsate. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute.

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, a rinse with ASTM Type II reagent water and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sampling program:

EPA Method	Description	Matrix	Number of Samples	Extras for Breakage	Total	Container Type
7420	Total Lead	W	28	2	30	500ml poly
8010/8020	VOCs	W	28	2	30	3x40ml gls
8015M	TPH Extractables-JP4/Gas	W	28	2	30	2x1L gls *
8015M	TPH Volatiles-Gasoline	W	5	1	6	3x40ml gls
8270	SVOCs	W	28	2	30	2x1L gls *
8010/8020	Trip Blank	W	5	2	7	40ml glass

*-1x1L gls for MS/MSD

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Betts:

- 2-inch submersible pump, controller, and reel
- Water level meter
- Photo ionization detector (PID)
- Interface probe
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Alconox or Liqui-Nox

Arizona Office Responsibility:

- Pesticide grade methanol (already on site)
- Sampling bottles and coolers (shipped to NVANG)
- Ground water monitoring data forms
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan
- Ultra pure water machine
- Peristaltic pump and disposable filter cartridges
- Arrangement for 55 gallon drums

Memorandum

FILE COPY

To: Robin Weesner and Dave Betts

From: Frank Lamphere

Subject: Ground Water Monitoring, NVANG, November 13-17, 1995

Date: November 7, 1995

This document outlines the details of ground water sampling on November 13 through November 17, 1995 at the Nevada Air National Guard (NVANG) Base, Reno, Nevada. On November 13 through November 17, ground water will be sampled at 21 existing monitoring wells. The locations of all monitoring wells to be sampled are shown in attached figure. **All changes from procedures used during the August 1995 sampling round will be denoted in bold print.**

Health and Safety Requirements

All personnel are to be familiar with and must follow the Sitewide Safety and Health Plan. This includes using the correct levels of personal protective equipment (PPE). Dave Betts, the Site Safety Officer, will ensure that all personnel present during field work fill out the daily tailgate forms.

Ground Water Level Round

A ground water level round will be performed prior to the collection of any ground water samples. Depth to ground water should be measured in all wells on the first day. The only wells which can be excluded from this round are the wells first on the sampling list (see list). The depth to ground water can be recorded when these wells are sampled.

Ground Water Sampling Procedures

Prior to purging each monitoring well, ground water levels will be measured using electric water level meter. Ground water level and

all purging and sampling information will be entered on Ground Water Monitoring forms.

All monitoring wells are 2" in diameter. The monitoring wells will be purged using a portable submersible pump and will be sampled using disposable bailers. Prior to sampling, three well volumes will be purged and parameters (pH, conductivity, and temperature) will be recorded on Ground Water monitoring forms. Well volume information for all monitoring wells is attached to this memo. Prior to collecting a ground water sample, the disposable bailers will be rinsed once with well water (first bail is discarded).

Purge water will be collected in well-specific 55-gallon drums. The drums will be labeled and stored on site, behind the Civil Engineering Building.

If present, floating product thickness in monitoring wells MW25, MW07, T-1, T-2, T-3, and T-4 will be recorded. If the thickness is measurable and a sample is to be collected, floating product will be removed using a dedicated product removal disposable bailer. Monitoring wells MW25, MW07, and T-4 will be sampled last. NOTE: ground water samples will not be collected from wells T-1 through T-3.

Depth to ground water measurements will be taken at all wells, including wells where no samples are collected. This is to ensure that an accurate ground water surface contour can be drawn.

Sampling Schedule

The following is a tentative schedule for ground water sampling:

November ~~21~~ 13, 1995: MW15, MW18(duplicate)*, MW17, MW30, (dup) MW32

November ~~22~~ 14, 1995: MW08 (MS/MSD), MW27, MW26, MW24, MW23

November ~~23~~ 15, 1995: MW28, MW29, MW03, MW04, MW05(duplicate)*(dup)

November ~~24~~ 16, 1995: (dup)MW10, MW06(CLP), MW31(CLP)

November ~~25~~ 17, 1995: MW25, MW07, T-4 (MS/MSD)

This schedule may be altered due to site operations and/or sampling speed.

NOTE: Purge water from wells MW05, MW06, MW07, MW17, MW25, and T-4 must be stored in the same 55-gallon drum.

Ground Water Sample Identifiers

Sample identifiers for original ground water samples will include the monitoring well number, and the quarterly sampling round (this is the **fourth** sampling round). For example, MW04-95-4 represent a ground water sample collected during the **fourth** round of quarterly sampling in 1995 from monitoring well MW04.

Analytical Parameters

Ground water samples collected from each well will be analyzed for:

- Volatile organic compounds (VOCs) using EPA Method 8010/8020 with 8240 for confirmation;
- Semivolatile organic compounds (SVOCs) using EPA Method 3550/8270;
- Extractable total petroleum hydrocarbons (TPH) using EPA Method 5030/8015;
- Lead using EPA Method 3050/7420.

Ground water analyses will be performed by Quanterra Analytical Services (QAS). Ground Water Samples will be shipped by Federal Express to QAS:

Quanterra Analytical Services
Att: Tracy Sidwell
1721 South Grand Ave.
Santa Ana, CA
92705
(714) 258-8610

A validation package will be requested from QAS for ground water samples collected from monitoring well MW06 and MW31 therefore, a separate Chain-of-Custody form will be prepared for MW07 and MW31. The trip blank for the sampling day should also be included on this Chain-of-Custody.

Quality Assurance/Quality Control (QA/QC) Samples

The following QA/QC samples will be collected. QA/QC samples will be analyzed for the same parameters as original samples with the exception of trip blanks. Trip blanks will only be analyzed for VOCs.

Duplicate Samples. Field duplicates will be collected at a frequency of 10 % of total number of original samples. **Duplicate ground water samples will be collected from monitoring wells MW05 and MW18** Sample identifiers for field duplicates are the same as the original sample but followed by an asterix (*). Collection time should be the same as original sample.

Trip Blanks. Trip blanks will be collected at the frequency of one per cooler per day. Sample identifiers for trip blanks are as follows: TB-date-#. For example TB111395-1 represents the first trip blank labeled on November 13, 1995.

MS/MSD. One MS/MSD will be designated for every 20 ground water samples. **MS/MSD will be requested for the sample collected from monitoring well MW08.** This should be indicated on the Chain-of-Custody form.

Field Blanks. Field blanks will be collected at the frequency of one every two days. Sample identifiers for field blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute. **Field blanks will be collected at MW26 and MW10.**

Equipment Rinsate. Rinsate blanks from decontaminated submersible pump will be collected at the frequency of one every two days. Sample identifiers for rinsate blanks will be the well identifier at which the blank was prepared followed by an asterix. Collection time should be original sample collection time plus one minute. **Equipment rinsate blanks will be collected at MW30 and MW03.**

Decontamination

All sampling equipment will be decontaminated prior to sampling, between monitoring wells, and after sampling activities have been completed. Decontamination will include scrubbing sampling equipment with a laboratory-grade detergent (such as Liqui-Nox or Alconox), followed by a rinse with potable water, **a rinse with ASTM Type II reagent water** and pesticide-grade methanol. All equipment will be allowed to air dry and either wrapped in aluminum foil or positioned to preclude inadvertent contamination prior to reuse.

Sampling Summary

The following table summarizes the sam[illegible] program:

EPA Method	Description	Matrix	Number of Samples	Extras for Breakage	Total	Container Type
7420	Total Lead	W	28	2	30	500ml poly
8010/8020	VOCs	W	28	2	30	3x40ml gls
8015M	TPH Extractables-JP4/Gas	W	28	2	30	2x1L gls *
8270	SVOCs	W	28	2	30	2x1L gls *
8010/8020	Trip Blank	W	5	2	7	40ml glass

*-1x1L gls for MS/MSD

Required Equipment and Materials

Equipment to be transported from Sacramento by Dave Betts:

- 2-inch submersible pump, controller, and reel
- Water level meter
- Photo ionization detector (PID)
- Interface probe
- pH, conductivity, and temperature meters
- Disposable bailers and nylon rope
- Alconox or Liqui-Nox

- Peristaltic pump and disposable filter cartridges
- 55-gallon drums
- Interface probe

Arizona Office Responsibility (shipped to Dave Betts or Base):

- Pesticide grade methanol (already on site)
- Sampling bottles and coolers (shipped to NVANG)
- Ground water monitoring data forms
- Calibration forms
- Chain-of-Custody forms
- Sample labels
- Drum labels
- Sitewide Safety and Health Plan
- Ultra pure water machine
- Peristaltic pump filters

ERM-West, Inc.

1777 Botelho Drive
Suite 260
Walnut Creek, CA 94596
(510) 946-0455
(510) 946-9968 (Fax)

September 19, 1995

Mr. Mike Frey
ANGRC/CEVR
3500 Fetchet Avenue
Andrews Air Force Base
Maryland, 20331-5157

ERM

Subject: Contract DAHA90-94-D-0014
Delivery Order 0017
Pilot Study Report
Reno Air National Guard Base

Dear Mr. Frey:

ERM West, Inc., (ERM) has completed the work for the above referenced delivery order. We are pleased to submit this Pilot Study Report in accordance with Task 2 of the delivery order. Three copies of this document are being transmitted to Major John Peck at the Reno Base.

Background

In March 1995, the Air National Guard Readiness Center (ANGRC) requested ERM to conduct a Treatability Study at the Nevada Air National Guard Base (referred hereafter to as the Base). The Treatability Study included installation of observation wells and product recovery equipment to initiate the Treatability Study at Site 7 of the Base.

Site 7, a petroleum, oil, and lubricant (POL) storage facility, consisted of four 25,000-gal underground JP-4 fuel tanks that were used for flight line operations and ancillary equipment. Numerous small JP-4 fuel spills had occurred around the backfill area above the tanks between 1973 and 1985.

During initiation of the Treatability Study, more than 6 feet of product was found floating on the groundwater table. This amount of product was more than ERM had anticipated since the amount seen in a monitoring well prior to the Study was consistently less than a foot. ERM estimated that 20,000 gallons of jet fuel were floating on the groundwater surface within the backfill area.

Upon discovery of this amount of product, ERM proposed an alternative method to quickly and cost-effectively remediate the site. In July 1995, ANGRC had contracted ERM to conduct a Pilot Study to initiate the

additional remediation. The Pilot Study was to include installation of three eight-inch extraction wells, removal of the product from the wells, and the disposal of the product.

Well Installations

ERM contracted West Hazmat Drilling Corp to install the three eight-inch extraction wells at Site 7. From August 21 to August 22, 1995, West Hazmat Drilling Corp, under the supervision of an ERM field engineer, installed extraction wells T-5, T-6, and T-7 within the backfill area. The locations of these extraction wells are shown in Drawing 6017.10-01. The drilling logs are attached in Appendix A.

Extraction Well T-5 was screened from 3.5 feet to 13.5 feet below ground surface; Extraction Well T-6 was screened from 4 feet to 14 feet below ground surface; and Extraction Well T-7 was screened from 4 feet to 11 feet below ground surface.

The initial product thickness observed in Extraction Well T-5 was 2.73 feet; product thickness observed in Extraction Well T-6 was 5.3 feet; and product thickness observed in Extraction Well T-7 was 5.3 feet.

Product Removal

ERM had contracted Americlean, Inc., (Americlean) to remove and recycle the petroleum product overlying the groundwater surface. Americlean provided a 5,000-gallon tank truck to Site 7 for each working day from August 23 to September 7, 1995. Americlean utilized a vacuum pump attached to the tank truck to extract from the three eight-inch wells. The purpose of having three extraction wells was to enable continuous operation. When the initial product layer within a well was completely extracted, extraction was switched to another well to enable product to recover in the original well. A three-way manifold was installed at the three extraction wells for ease of operation. Whenever a well was pumped dry of product, the valve positions at the manifold were altered to allow extraction from another well.

An ERM field engineer was on site to supervise the activities and to make certain no groundwater was extracted. Table 2 presents the volume of product extracted during the ten days of operation. A total of 10,008 gallon of product was extracted from the three wells. The product thickness in Extraction Well T-5 was decreased from 2.73 feet to 0.60 feet; product thickness in Extraction Well T-6 was decreased from 5.30 feet to 1.10 feet; and the product thickness in Extraction Well T-7 was decreased from 5.3 feet to 1.5 feet.

According to the data collected during extraction, it was noted that the recovery rate for the first few hours was faster than recovery later in the day. The recharge time was approximately 15 to 20 minutes for the first three hours and extended to about 30 to 40 minutes later in the day. The faster recovery of product provided a greater extraction rate. Based on this data, ERM chose to divide the last few days of extraction into half days to take advantage of the faster recovery rates.

The extracted product was hauled off site each day to Americlean's processing plant in Silver Spring, Nevada. The Silver Springs facility is a permitted waste oil recycling facility.

Please contact me at (510) 946-0455 if you have any questions or comments regarding this document.

Sincerely,

ERM-WEST, INC

James E. Quinn, P.E.
Program Manager

FTW/ftw/6017.10

Attachments: Table 1 - Product Thickness Measurements
Table 2 - Volume of Product Extracted during Pilot Study
Drawing 6017.10-01
Appendix A

cc: Major John Peck, 152nd TAC Clinic/EM
Ms. Jeanie Kampschroeder, NGB-AQC-E (transmittal letter only)

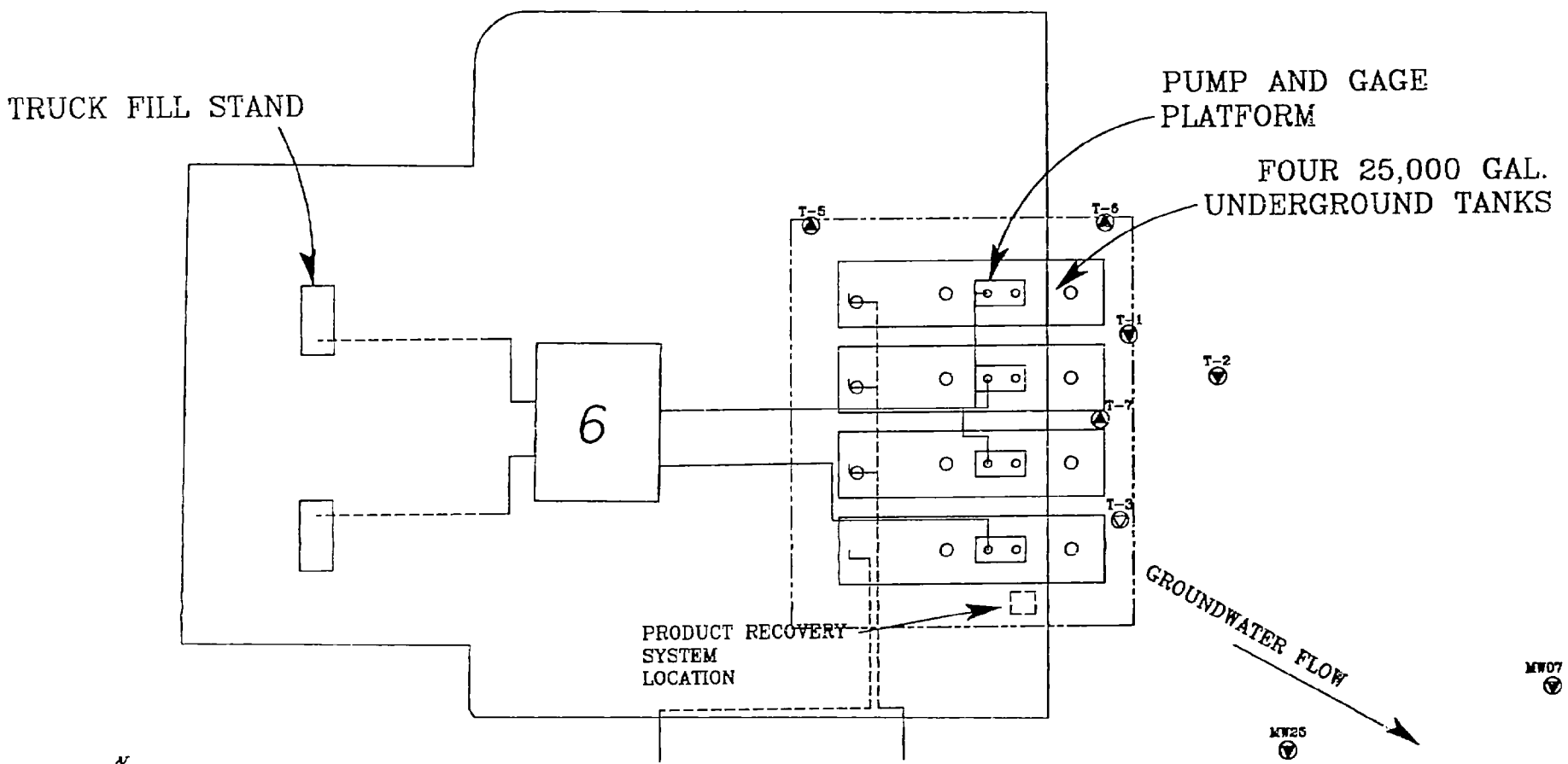
Table-1 Product Thickness Measurements during Pilot Study

Date	T-5 Product Thickness (ft.)	T-6 Product Thickness (ft.)	T-7 Product Thickness (ft.)
8/23/95	2.73	5.30	5.30
8/24/95	3.50	3.84	4.64
8/25/95	2.68	2.95	4.20
8/29/95	3.00	3.50	3.50
8/30/95	2.00	2.00	3.50
8/31/95	1.80	2.00	3.00
9/1/95	0.60	1.10	1.50

Table-2 Volume of Product Extracted during Pilot Study

Date	Volume of Product Extracted (gallons)	Average Hourly Extraction Rate (gallons /hr)
8/23/95	1,959.0	326.5
8/24/95	1,876.0	229.3
8/25/95	1,125.0	153.4
8/29/95	950.0	158.3
8/30/95	1,256.1	158.4
8/31/95	839.0	110.6
9/1/95	540.0	148.5
9/5/95	910.3	114.0
9/6/95	227.6	114.0
9/7/95	325.0	162.5
Total =	10,008	

11



REV	DATE	REVISION	APPD	REV BY

THE ERM GROUP

EXTRACTION WELL INSTALLATION

1" = 25' | 9-15-95 | 6017.10-01 | 6017.10

NEVADA AIR NATIONAL GUARD | REV

APPENDIX A

DRILLING LOGS

ENVIRONMENTAL RESOURCES MANAGEMENT
ERM-WEST

FIELD WELL COMPLETION FORM

Job Name: RENO - ANG Owner: AIR NATIONAL GAURD

Location: RENO - NEVADA Job #: 6017.10

Logged By: AFF Reviewed By: _____ Project Manager: ROBIN WEEGNER

Well Number: T-5 Driller: MIKE LESTER

Date of Installation: 8-22-95 Hours Drilled: _____

Equipment: 15" Inch Hollow Stem Auger _____ Inch Rotary Wash

Gallons of Water Used During Drilling: ~ 10 Gallons: ~ 10

Method of Decontamination Prior to Drilling: NA

Well Permit #: NA Issuing Agency: NA

DEVELOPMENT

Method of Development: NA

Development Begin Date: NA Time: NA

Depth to Water Before Development: NA Feet

Yield: GPM	Time: From: To	Date:
Yield: GPM	Time: From: To	Date:

Total Water Removed During Development: NA Gallons

Description of Turbidity at End of Development: ☐ Clear ☐ Mod. Turbid ☐ Slightly cloudy ☐ Very Muddy

Odor of Water: JP-4 / PRODUCT FLOATING

Water Discharged To: ☐ Ground Surface ☐ Storm Sewers ☐ Drums ☒ Tank Truck ☐ Storage Tank ☐ Other

Depth to Water After Development: NA Feet

Date/Time Well Development Complete: NA

Well Elevation: _____ Feet ..... Measuring Point (i.e. Top of Casing): _____

MATERIALS USED

60 Sacks of #2/12 LONESTAR Sand

_____ Sacks of _____ Cement

_____ Gallons of Grout Used

_____ Sacks of Powdered Bentonite

_____ Pounds of Bentonite Pellets

5 Feet of 8 Inch PVC Blank Casing

10 Feet of 8 Inch PVC Slotted Screen

_____ Feet of _____ Inch Steel Conductor Casing

_____ Yards³ Cement-Sand (Redi-Mix) Ordered

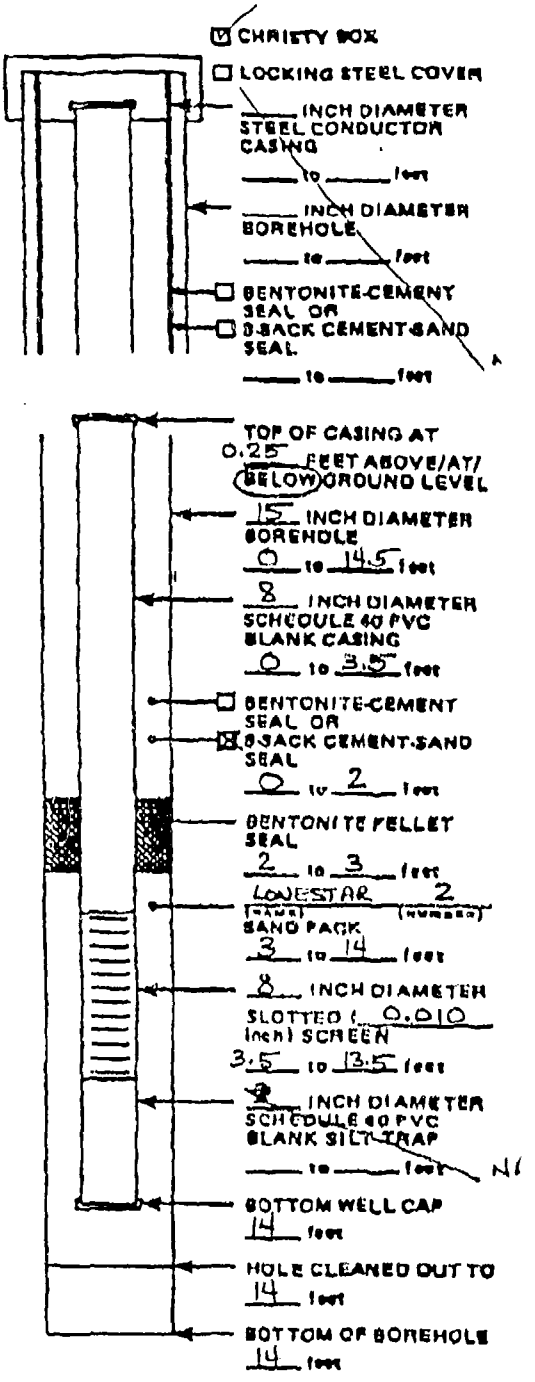
_____ Yards³ Cement-Sand (Redi-Mix) Used

Concrete Pumper Used? ✓ No _____ Yes

Name _____

Well Cover Used: _____ Locking Steel Cover; _____ Diversified Well Products Box; X Christy Box; _____ Other _____

Silt Trap Used? X No _____ Yes



NOT TO SCALE

ADDITIONAL INFORMATION:

THIS WELL IS LOCATED NEAR THE NW CORNER OF FORMER EXCAVATED AREA.

ENVIRONMENTAL RESOURCES MANAGEMENT
ERM-WEST

FIELD WELL COMPLETION FORM

Job Name: RENO ANG Owner: AIR NATIONAL GAURD
Location: RENO- NEVADA Job #: 6017.10
Logged By: AFF Reviewed By: Project Manager: ROBIN WEESNER
Well Number: I-6 Driller: MIKE LESTER
Date of Installation: 8-22-95 Hours Drilled:
Equipment: 15 Inch Hollow Stem Auger ____ Inch Rotary Wash
Gallons of Water Used During Drilling: ~10 Gallons: ~10
Method of Decontamination Prior to Drilling: NA
Well Permit #: NA Issuing Agency: NA

DEVELOPMENT

Method of Development: NA
Development Begun Date: NA Time: NA
Depth to Water Before Development: ____ Feet

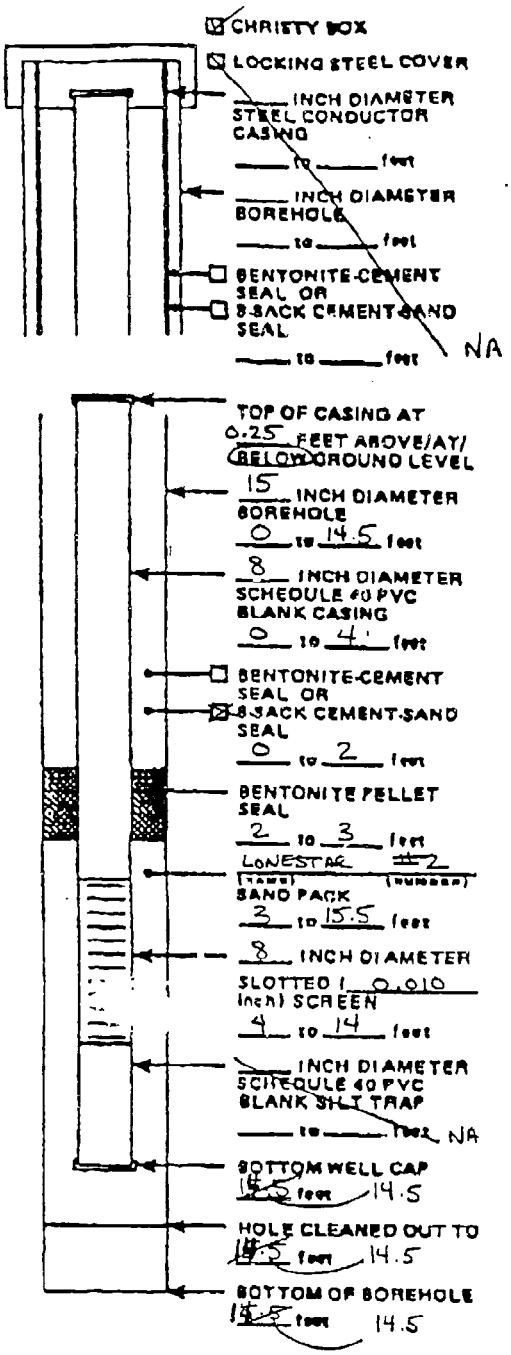
Yield: GPM	Time: From To	Date
Yield: GPM	Time: From To	Date

Total Water Removed During Development: NA Gallons
Description of Turbidity at End of Development: ☐ Clear ☐ Slightly cloudy ☐ Mod. Turbid ☐ Very Muddy
Odor of Water: JP-4 / FLOATING PRODUCT
Water Discharged To: ☐ Ground Surface ☐ Storm Sewer ☐ Drums ☒ Tank Truck ☐ Storage Tank ☐ Other
Depth to Water After Development: NA Feet Date/Time Well Development Complete: NA
Well Elevation: ____ Feet ..... Measuring Point (i.e. Top of Casing): ____

MATERIALS USED

6 Sacks of #2/12 LONESTAR Sand
____ Sacks of ____ Cement
____ Gallons of Grout Used
____ Sacks of Powdered Bentonite
____ Pounds of Bentonite Pellets
5 Feet of 8 Inch PVC Blank Casing
10 Feet of 8 Inch PVC Slotted Screen
____ Feet of ____ Inch Steel Conductor Casing
____ Yard³ Cement-Sand (Redi-Mix) Ordered
____ Yard³ Cement-Sand (Redi-Mix) Used
Concrete Pumper Used? ✓ No ____ Yes
Name ____

Well Cover Used: ____ Locking Steel Cover ____ Diversified Well Products Box ✓ Christy Box ____ Other ____
Silt Trap Used? X No Yes



NOT TO SCALE

ADDITIONAL INFORMATION:
THIS WELL IS LOCATED NEAR THE NORTHEAST CORNER OF FORMER EXCAVATED AREA.

ENVIRONMENTAL RESOURCES MANAGEMENT
ERM-WEST

FIELD WELL COMPLETION FORM

Job Name: RENO - ANG Owner: AIR NATIONAL GAURD

Location: RENO - NEVADA Job #: 6017.10

Logged By: AFF Reviewed By: _____ Project Manager: ROBIN WEESNER

Well Number: T-7 Driller: MIKE LESTER

Date of Installation: 8-22-95 Hours Drilled: _____

Equipment: 15 Inch Hollow Stem Auger _____ Inch Rotary Wash

Gallons of Water Used During Drilling: ~10 Gallons: ~10

Method of Decontamination Prior to Drilling: NA

Well Permit #: NA Issuing Agency: NA

DEVELOPMENT

Method of Development: NA

Development Began Date: NA Time: NA

Depth to Water Before Development: NA Feet

Yield: GPM	Time: From: To	Date:
Yield: GPM	Time: From: To	Date:

Total Water Removed During Development: NA Gallons

Description of Turbidity at End of Development: ☐ Clear ☐ Mod. Turbid ☐ Slightly cloudy ☐ Very Muddy

Odor of Water: NA

Water Discharged To: ☐ Ground Surface ☐ Storm Sewers ☐ Drums ☒ Tank Truck ☐ Storage Tank ☐ Other

Depth to Water After Development: NA Feet

Date/Time Well Development Complete: NA

Well Elevation: _____ Feet ..... Measuring Point (i.e. Top of Casing): _____

MATERIALS USED

5 Sacks of #2/12 LONESTAR Sand

_____ Sacks of _____ Cement

_____ Gallons of Grout Used

_____ Sacks of Powdered Bentonite

_____ Pounds of Bentonite Pellets

5 Feet of 8 Inch PVC Blank Casing

10 Feet of 8 Inch PVC Slotted Screen

_____ Feet of _____ Inch Steel Conductor Casing

_____ Yard³ Cement-Sand (Redi-Mix) Ordered

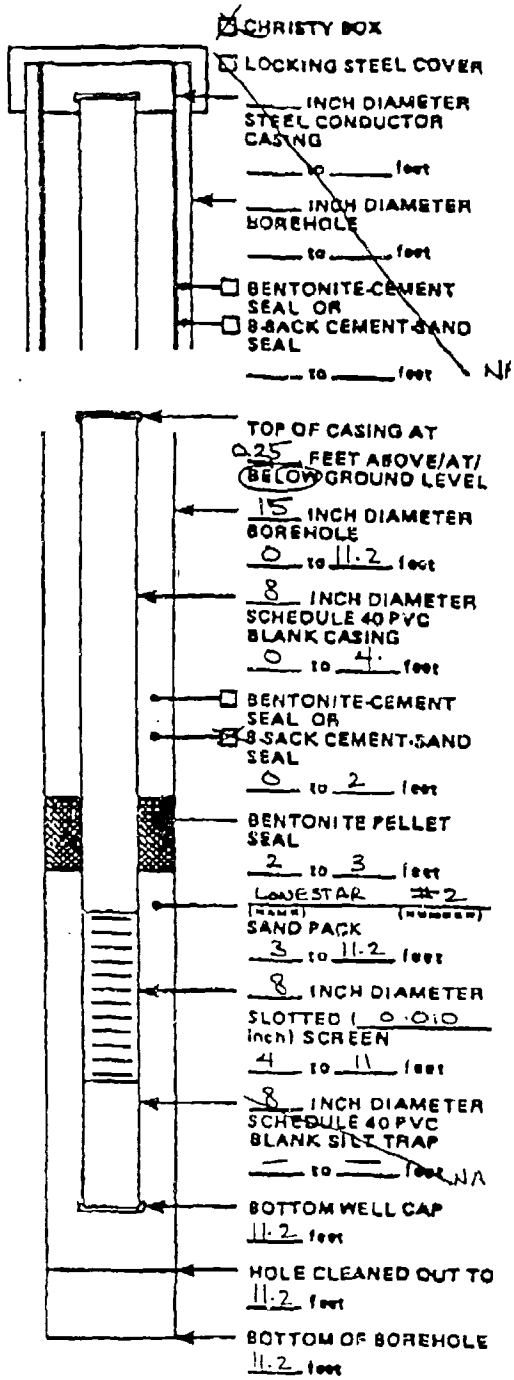
_____ Yard³ Cement-Sand (Redi-Mix) Used

Concrete Pumper Used? X No _____ Yes

Name _____

Well Cover Used: _____ Locking Steel Cover; _____ Diversified Well Products Box; X Christy Box; _____ Other _____

Silt Trap Used? X No _____ Yes



NOT TO SCALE

ADDITIONAL INFORMATION: THIS WELL IS LOCATED BETWEEN 2 LARGE JP-8 TANKS ON THE WEST SIDE OF THE FENCE.

APPENDIX B

FIELD GC RESULTS

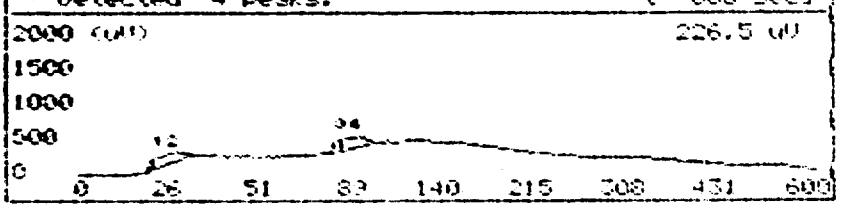
5/16/95

Batch blank

G.C. Ready 10S+ GC Function May 16,95 05:58
-- Analysis No 1 -- Run at - May 16,95 07:33 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.291 mVS	-No-	21.1 sec
2	Unknown	1.102 mVS	-No-	46.6 sec
3	Unknown	0.353 mVS	-No-	61.4 sec
4	Unknown	1.125 mVS	-No-	89.4 sec

- Detected 4 peaks. [605 sec]

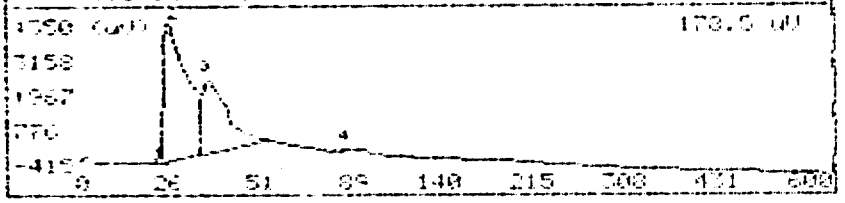


Syringe blank A

G.C. Ready 10S+ GC Function May 16,95 08:16
-- Analysis No 2 -- Run at - May 16,95 08:04 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.287 mVS	-No-	20.6 sec
2	Unknown	14.51 mVS	-No-	44.3 sec
3	Unknown	10.04 mVS	-No-	55.2 sec
4	Unknown	0.640 mVS	-No-	77.1 sec

- Detected 4 peaks. [605 sec]

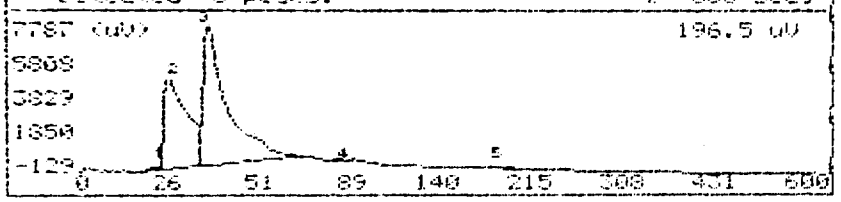


Syringe blank B

G.C. Ready 10S+ GC Function May 16,95 08:34
-- Analysis No 3 -- Run at - May 16,95 08:20 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.719 mVS	-No-	20.6 sec
2	Unknown	25.58 mVS	-No-	44.3 sec
3	Unknown	33.83 mVS	-No-	55.2 sec
4	Unknown	0.429 mVS	-No-	70.6 sec
5	Unknown	1.079 mVS	-No-	101.4 sec

- Detected 5 peaks. [605 sec]



Method blank

```
   G.C. Ready      10S+ GC Function  May 16,95  08:42
 -- Analysis No 4      -- Run at - May 16,95  08:33 -
Pk No      Name          Area          Alarm    Ret.Time
  1   Unknown          10.35 mUS      -No-       24.1 sec
  2   Unknown          36.27 mUS      -No-       46.4 sec
  3   Unknown          61.65 mUS      -No-       68.1 sec
  4   Unknown          2.793 mUS      -No-      102.6 sec
 --
 --
 --
 --
 - Detected  4 peaks.                        [  503 sec]
9216 (uU)                                    229.0 uU
6889
4560
2231
-97
 0      26      51      89      140     215     308     431     600
```

50 mg/L
100 mL

```
   G.C. Ready      10S+ GC Function  May 16,95  09:00
 -- Analysis No 5      -- Run at - May 16,95  08:48 -
Pk No      Name          Area          Alarm    Ret.Time
  2   Unknown          27.62 mUS      -No-       26.1 sec
  3   Unknown          30.44 mUS      -No-       44.4 sec
  4   Unknown          8.554 mUS      -No-       68.0 sec
  5   Unknown          131.6 mUS      -No-       87.2 sec
  6   Unknown          74.76 mUS      -No-      101.4 sec
  7   Unknown          158.5 mUS      -No-      [illegible] sec
  8   Unknown          26.03 mUS      -No-      [illegible] sec
  9   Unknown          68.12 mUS      -No-       414.4 sec
 10   Unknown          9.957 mUS      -No-       488.8 sec
 - Detected 10 peaks. Use ↑ ↓ to scroll  [  605 sec]
26   (mU)                                    178.5 uU
19
13
6
0
 0      26      51      89      140     215     308     431     600
```

B
F
P E
E
X-P
Xo

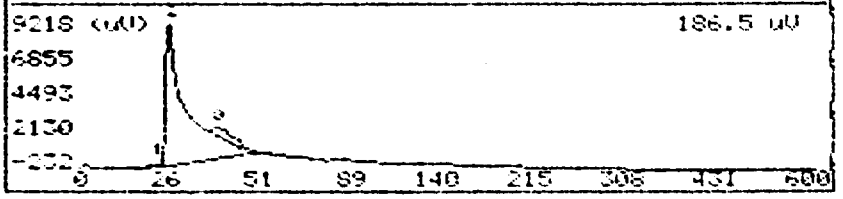
500 mg/L
50 mL

```
   G.C. Ready      10S+ GC Function  May 16,95  09:15
 -- Analysis No 6      -- Run at - May 16,95  09:02 -
Pk No      Name          Area          Alarm    Ret.Time
  3   Unknown          33.65 mUS      -No-       26.3 sec
  4   Unknown          31.38 mUS      -No-       44.6 sec
  5   Unknown          8.176 mUS      -No-       68.0 sec
  6   Unknown          76.04 mUS      -No-       87.4 sec
  7   Unknown          434.3 mUS      -No-      101.6 sec
  8   Unknown          612.2 mUS      -No-      257.0 sec
  9   Unknown          139.4 mUS      -No-      304.0 sec
 10   Unknown          316.0 mUS      -No-       414.4 sec
 11   Unknown          64.36 mUS      -No-       488.8 sec
 - Detected 11 peaks. Use ↑ ↓ to scroll  [  605 sec]
123  (mU)                                    208.5 uU
92
61
30
0
 0      26      51      89      140     215     308     431     600
```

G.C. Ready 105+ GC Function May 16,95 09:37
-- Analysis No 7 -- Run at - May 16,95 09:22 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.205 mVS	-No-	21.5 sec
2	Unknown	59.00 mVS	-No-	25.2 sec
3	Unknown	3.396 mVS	-No-	37.6 sec

- Detected 3 peaks. [605 sec]

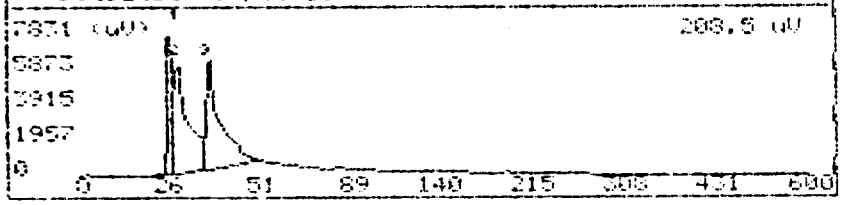


203-95-2
100-l

G.C. Ready 105+ GC Function May 16,95 10:14
-- Analysis No 8 -- Run at - May 16,95 10:04 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	12.21 mVS	-No-	24.6 sec
2	Unknown	20.53 mVS	-No-	25.9 sec
3	Unknown	24.29 mVS	-No-	35.8 sec

- Detected 3 peaks. [582 sec]

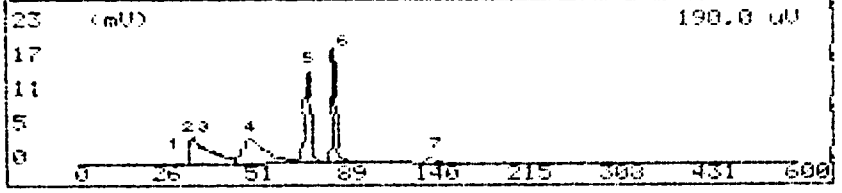


1WOB-95-2
100-l

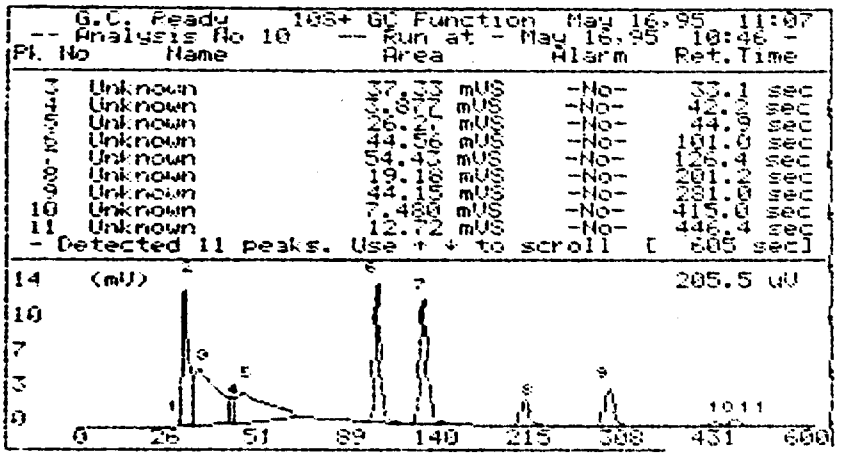
G.C. Ready 105+ GC Function May 16,95 10:42
-- Analysis No 9 -- Run at - May 16,95 10:22 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.991 mVS	-No-	27.5 sec
2	Unknown	27.62 mVS	-No-	31.0 sec
3	Unknown	0.821 mVS	-No-	34.0 sec
4	Unknown	30.24 mVS	-No-	46.8 sec
5	Unknown	52.82 mVS	-No-	53.4 sec
6	Unknown	47.05 mVS	-No-	61.2 sec
7	Unknown	4.497 mVS	-No-	129.8 sec

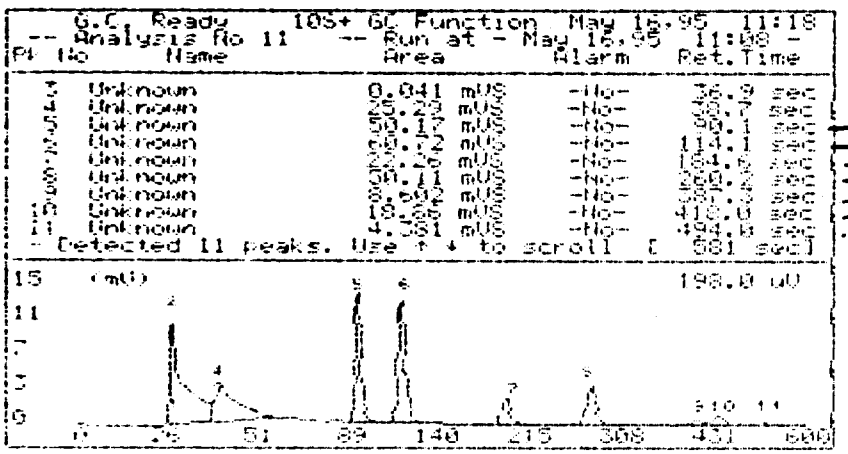
- Detected 7 peaks. [566 sec]



50 ng/L
100 µL

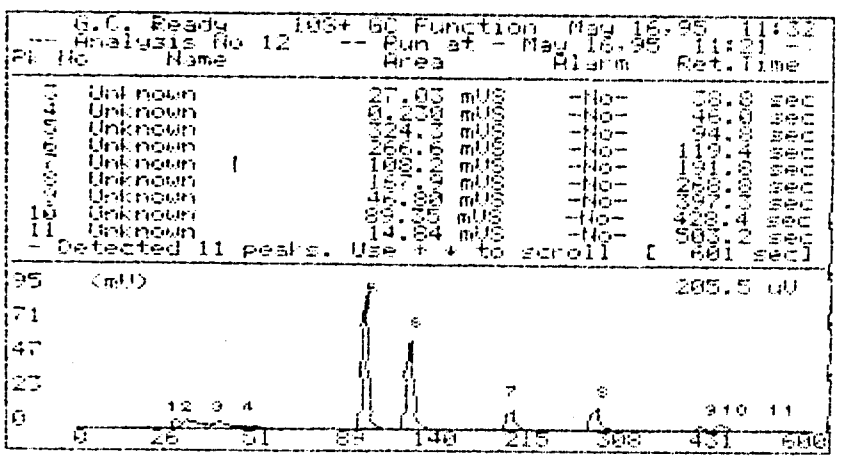


50 ng/L
100 µL



B
TCE
T
PCE
E
x_{mp}
x_o

500 ng/L
50 µL

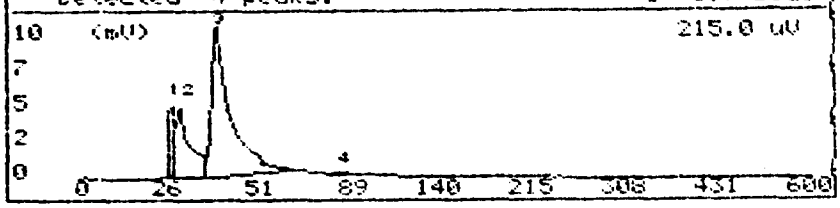


MW03-95-2

G.C. Ready 10S+ GC Function May 16,95 11:45
-- Analysis No 13 -- Run at - May 16,95 11:34 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	9.882 mUS	-No-	25.4 sec
2	Unknown	21.344 mUS	-No-	47.6 sec
3	Unknown	64.771 mUS	-No-	60.6 sec
4	Unknown	0.771 mUS	-No-	76.8 sec

- Detected 4 peaks. [597 sec]

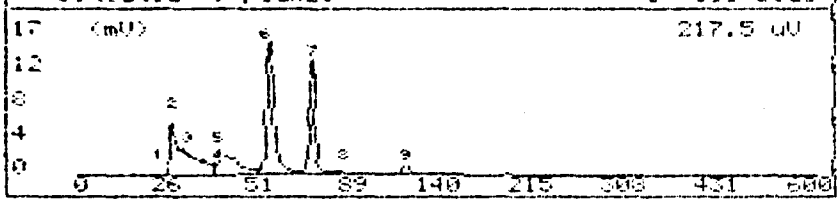


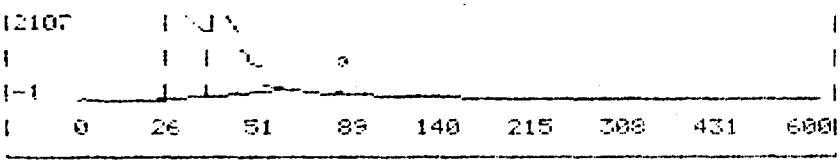
MW08-95-2

G.C. Ready 10S+ GC Function May 16,95 11:57
-- Analysis No 14 -- Run at - May 16,95 11:47 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.212 mUS	-No-	22.8 sec
2	Unknown	50.36 mUS	-No-	56.0 sec
3	Unknown	0.129 mUS	-No-	68.4 sec
4	Unknown	0.312 mUS	-No-	72.4 sec
5	Unknown	16.6 mUS	-No-	80.4 sec
6	Unknown	300.2 mUS	-No-	89.6 sec
7	Unknown	42.8 mUS	-No-	96.8 sec
8	Unknown	0.975 mUS	-No-	106.4 sec
9	Unknown	0.240 mUS	-No-	116.5 sec

- Detected 9 peaks. [600 sec]





584-1-1.5

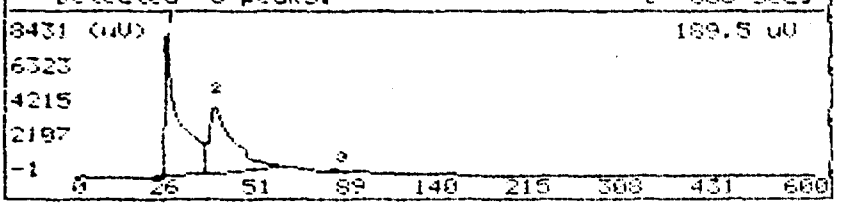
100 µl

10.0 g

G.C. Ready 10S+ GC Function May 16,95 12:12
-- Analysis No 15 -- Run at - May 16,95 12:00 -

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	35.84	mVS	-No-	25.0 sec
2	Unknown	56.16	mVS	-No-	68.0 sec
3	Unknown	0.690	mVS	-No-	77.3 sec

- Detected 3 peaks. [605 sec]



584-6-10

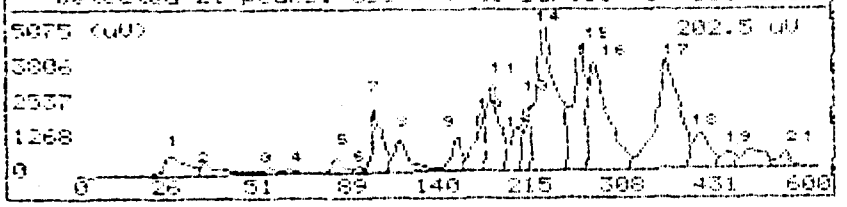
10 µl

12.0 g

G.C. Ready 10S+ GC Function May 16,95 12:32
-- Analysis No 16 -- Run at - May 16,95 12:20 -

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	4.988	mVS	-No-	24.5 sec
2	Unknown	4.858	mVS	-No-	34.4 sec
3	Unknown	0.238	mVS	-No-	53.0 sec
4	Unknown	0.354	mVS	-No-	57.1 sec
5	Unknown	3.340	mVS	-No-	77.4 sec
6	Unknown	0.969	mVS	-No-	80.5 sec
7	Unknown	13.64	mVS	-No-	92.4 sec
8	Unknown	11.02	mVS	-No-	112.1 sec
9	Unknown	9.798	mVS	-No-	144.2 sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 10S+ GC Function May 16,95 12:32
-- Analysis No 16 -- Run at - May 16,95 12:20 -

Pk No	Name	Area		Alarm	Ret.Time
10	Unknown	19.85	mVS	-No-	164.0 sec
11	Unknown	35.21	mVS	-No-	174.6 sec
12	Unknown	14.41	mVS	-No-	193.6 sec
13	Unknown	17.82	mVS	-No-	204.2 sec
14	Unknown	91.45	mVS	-No-	216.6 sec
15	Unknown	67.96	mVS	-No-	249.6 sec
16	Unknown	84.44	mVS	-No-	265.0 sec
17	Unknown	131.8	mVS	-No-	284.6 sec
18	Unknown	31.05	mVS	-No-	302.4 sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]

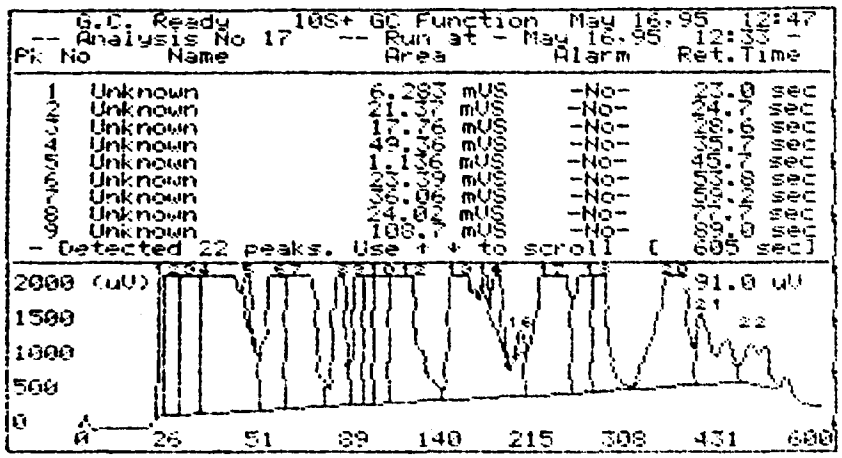
G.C. Ready 10S+ GC Function May 16,95 12:33
-- Analysis No 16 -- Run at - May 16,95 12:20 -

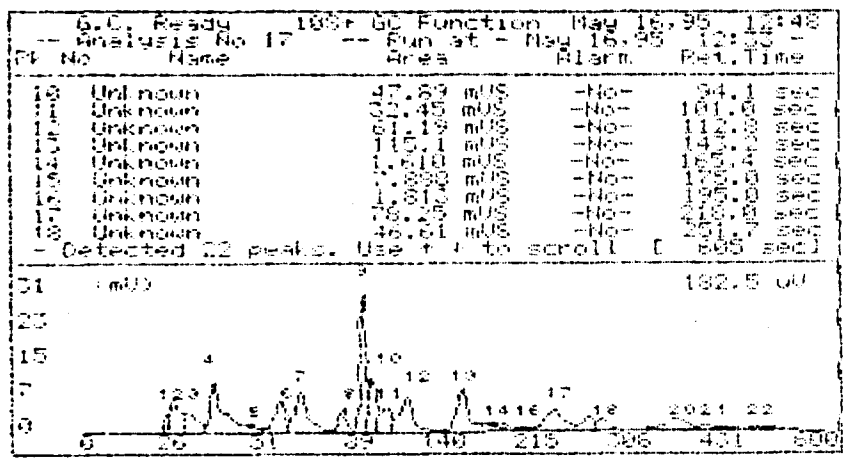
Pk No	Name	Area		Alarm	Ret.Time
13	Unknown	17.82	mVS	-No-	204.2 sec
14	Unknown	91.45	mVS	-No-	216.6 sec
15	Unknown	67.96	mVS	-No-	249.6 sec
16	Unknown	84.44	mVS	-No-	265.0 sec
17	Unknown	131.8	mVS	-No-	284.6 sec
18	Unknown	31.05	mVS	-No-	302.4 sec
19	Unknown	14.66	mVS	-No-	320.2 sec
20	Unknown	11.86	mVS	-No-	334.2 sec
21	Unknown	13.23	mVS	-No-	352.4 sec

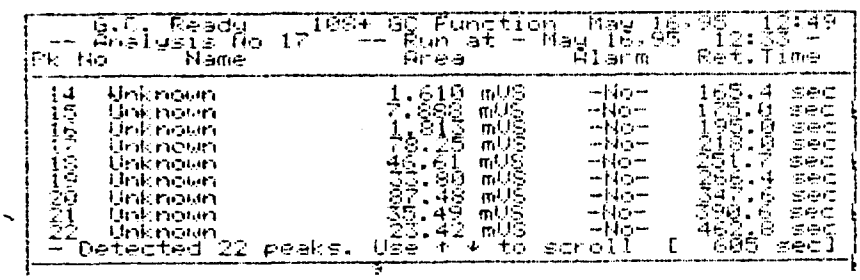
- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]

MW06-95-2

200 µl

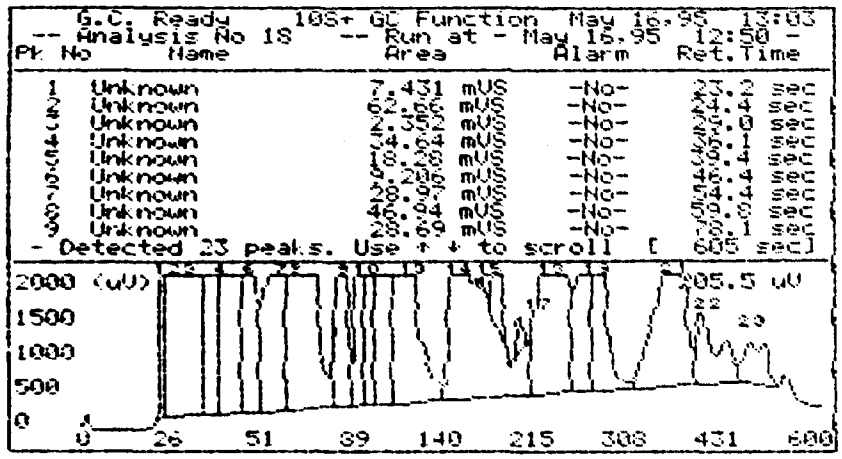


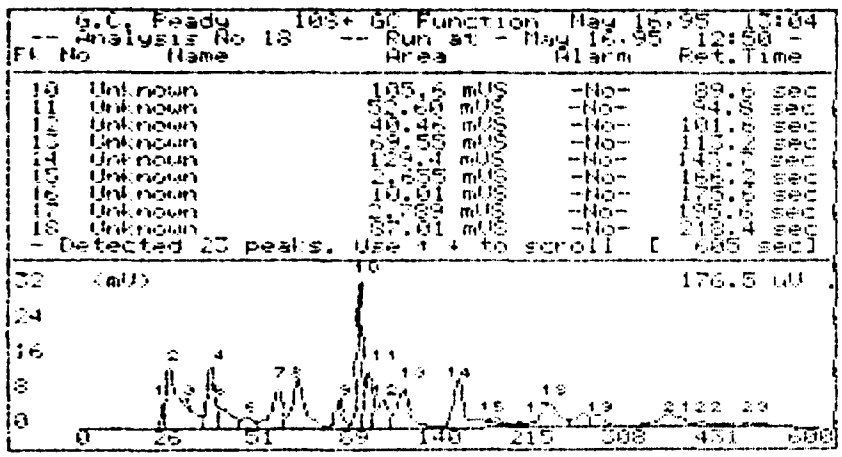


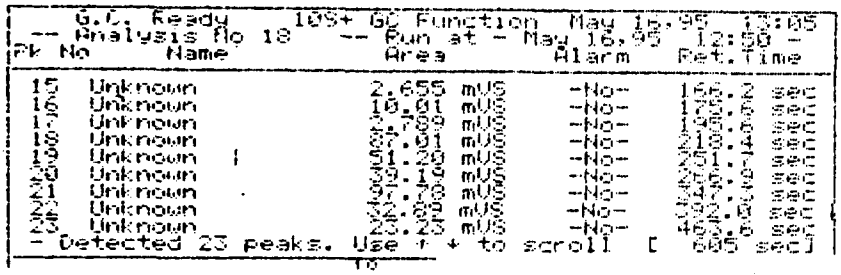


MW06-95-2*

200 µl



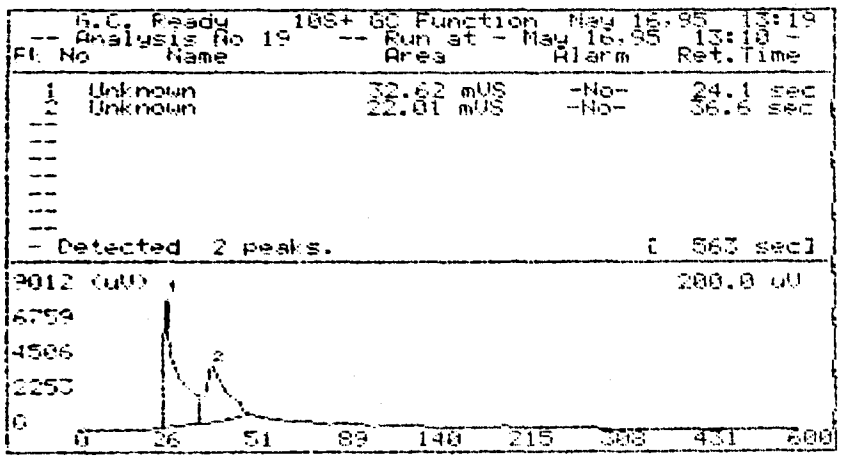




SB4-1-3.5

100 ml

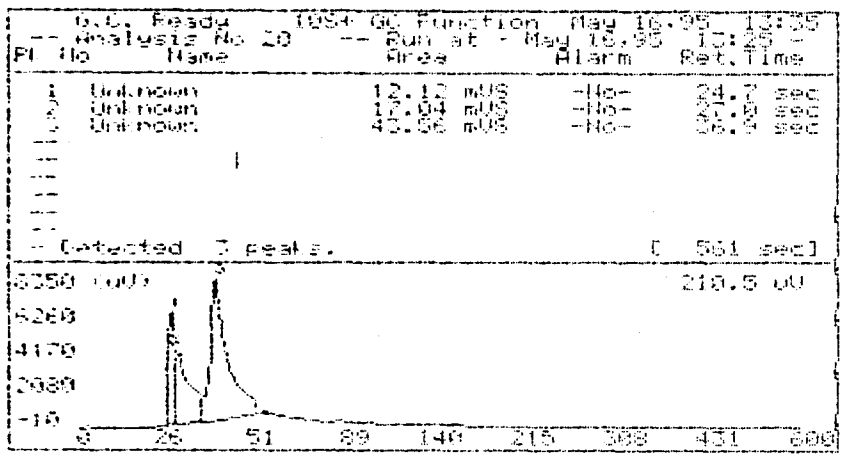
10.5 g



SB4-1-5.5

100 ml

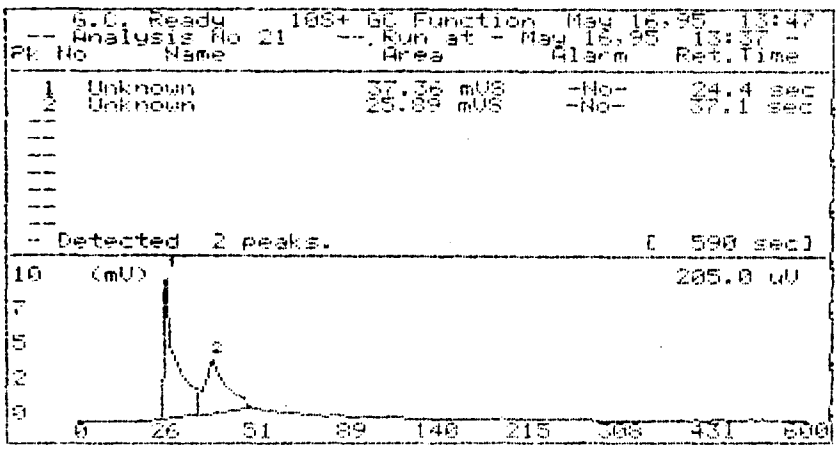
10.9 g



SB4-1-9

100 ml

11.1 g



SB4-6-5.5

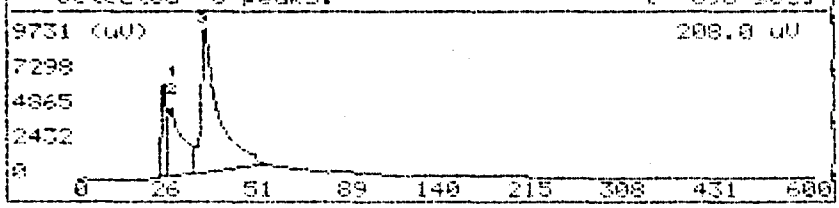
100 ml

12.1 g

G.C. Ready 10S+ GC Function May 16,95 14:00
-- Analysis No 22 -- Run at - May 16,95 13:49 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	10.32 mUS	-No-	22.5 sec
2	Unknown	18.40 mUS	-No-	25.6 sec
3	Unknown	51.54 mUS	-No-	35.0 sec

- Detected 3 peaks. [598 sec]



SB4-6-7.5

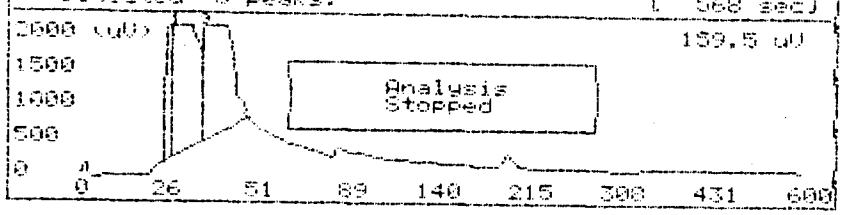
200 ml

15.5g

Analyzing 10S+ GC Function May 16,95 14:12
-- Analysis No 23 -- Run at - May 16,95 14:02 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	7.693 mUS	-No-	24.8 sec
2	Unknown	19.71 mUS	-No-	27.0 sec
3	Unknown	22.50 mUS	-No-	35.8 sec

- Detected 3 peaks. [568 sec]

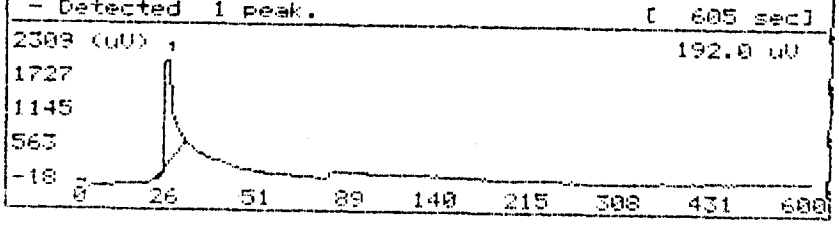


Syringe blank C

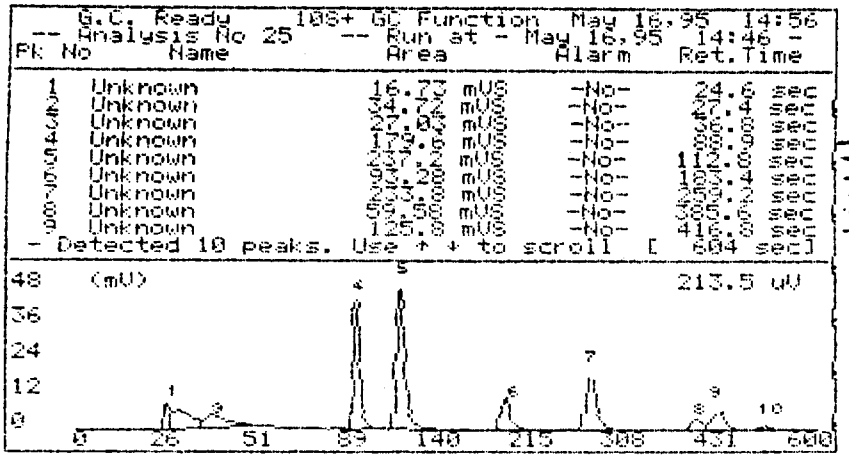
G.C. Ready 10S+ GC Function May 16,95 14:43
-- Analysis No 24 -- Run at - May 16,95 14:13 -

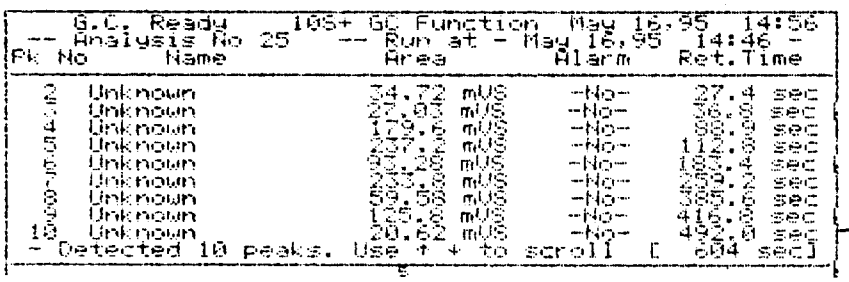
Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	4.627 mUS	-No-	24.4 sec

- Detected 1 peak. [605 sec]



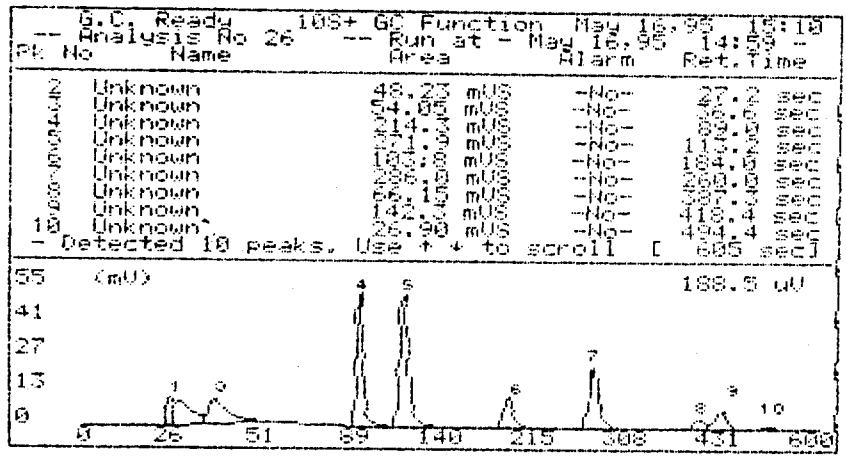
50 ng/L
100 µL





B
b<R

50 ng/L std
?

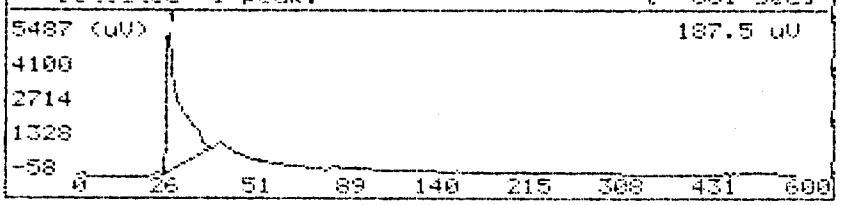


MW 07-95-2*
100, l

G.C. Ready 10S+ GC Function May 16,95 15:25
-- Analysis No 27 -- Run at - May 16,95 15:16 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	22.20 mVS	-No-	25.3 sec

- Detected 1 peak. [561 sec]

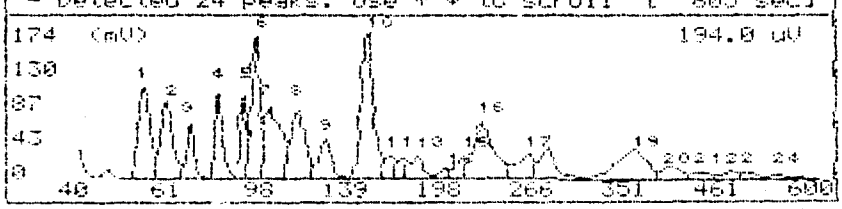


MW 07-95-2
100-2

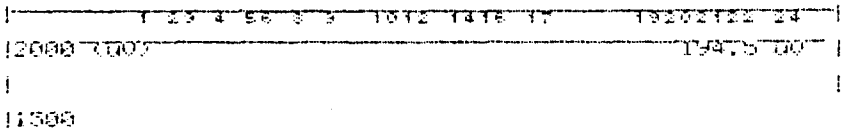
G.C. Ready 105+ GC Function May 16,95 15:46
-- Analysis No 28 -- Run at - May 16,95 15:27 --

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	278.8	mUS	-No-	54.5 sec
2	Unknown	1.000	mUS	-No-	74.5 sec
3	Unknown	1.000	mUS	-No-	84.5 sec
4	Unknown	1.000	mUS	-No-	94.5 sec
5	Unknown	1.000	mUS	-No-	104.5 sec
6	Unknown	1.000	mUS	-No-	114.5 sec
7	Unknown	1.000	mUS	-No-	124.5 sec
8	Unknown	1.000	mUS	-No-	134.5 sec
9	Unknown	1.000	mUS	-No-	144.5 sec
10	Unknown	1.000	mUS	-No-	154.5 sec
11	Unknown	1.000	mUS	-No-	164.5 sec
12	Unknown	1.000	mUS	-No-	174.5 sec
13	Unknown	1.000	mUS	-No-	184.5 sec
14	Unknown	1.000	mUS	-No-	194.5 sec
15	Unknown	1.000	mUS	-No-	204.5 sec
16	Unknown	1.000	mUS	-No-	214.5 sec
17	Unknown	1.000	mUS	-No-	224.5 sec
18	Unknown	1.000	mUS	-No-	234.5 sec

- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]



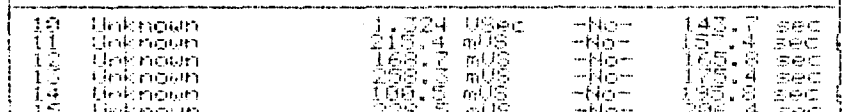
| 18 Unknown 604.4 mUS -No- 268.2 sec |
- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 105+ GC Function May 16,95 15:46
-- Analysis No 28 -- Run at - May 16,95 15:27 --

Pk No	Name	Area		Alarm	Ret.Time
19	Unknown	1.224	USec	-No-	142.7 sec
11	Unknown	215.4	mUS	-No-	154.5 sec
12	Unknown	160.7	mUS	-No-	164.5 sec
13	Unknown	250.1	mUS	-No-	174.5 sec
14	Unknown	100.5	mUS	-No-	184.5 sec
15	Unknown	220.6	mUS	-No-	194.5 sec
16	Unknown	1.014	USec	-No-	210.6 sec
17	Unknown	479.4	mUS	-No-	221.7 sec
18	Unknown	604.4	mUS	-No-	268.2 sec

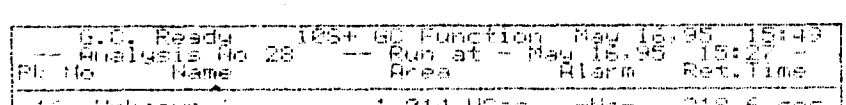
- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]



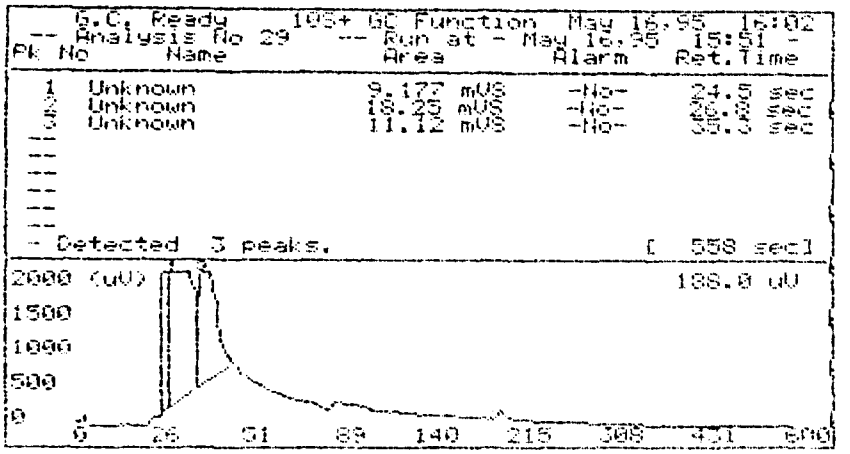
G.C. Ready 105+ GC Function May 16,95 15:46
-- Analysis No 28 -- Run at - May 16,95 15:27 --

Pk No	Name	Area		Alarm	Ret.Time
16	Unknown	1.014	USec	-No-	210.6 sec
17	Unknown	479.4	mUS	-No-	221.7 sec
18	Unknown	604.4	mUS	-No-	268.2 sec
19	Unknown	1.238	USec	-No-	279.3 sec
20	Unknown	344.4	mUS	-No-	289.2 sec
21	Unknown	180.1	mUS	-No-	299.2 sec
22	Unknown	214.9	mUS	-No-	309.2 sec
23	Unknown	147.5	mUS	-No-	319.2 sec
24	Unknown	110.1	mUS	-No-	329.2 sec

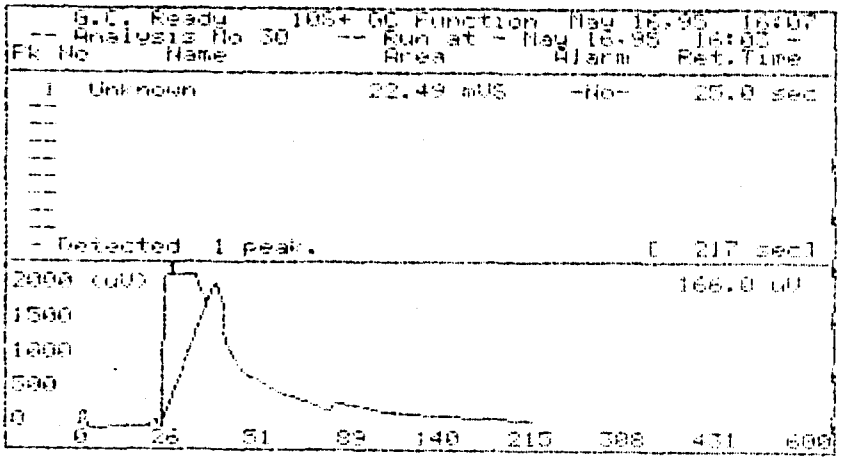
- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]



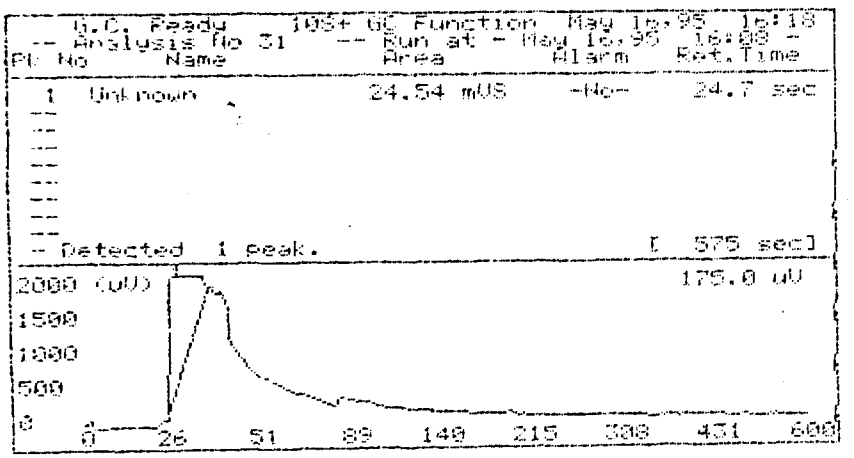
SBH-5-1.5
100.l
10.2g



Syringe blank
250 µl



SBH-6; 1.5
100 µl
10.8g



SB4-5.35

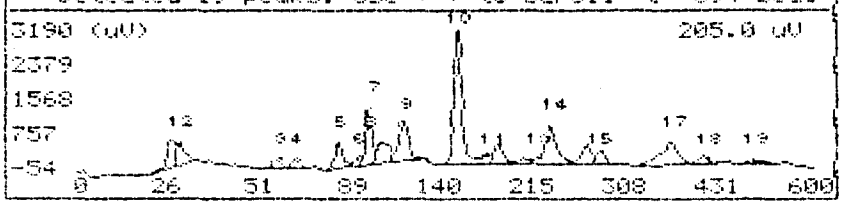
10 µl

11.2g

G.C. Ready 105+ GC Function May 16,95 16:31
-- Analysis No 32 -- Run at - May 16,95 16:20 -

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	1.894	mUS	-No-	25.4 sec
2	Unknown	1.114	mUS	-No-	27.9 sec
3	Unknown	0.660	mUS	-No-	45.1 sec
4	Unknown	0.330	mUS	-No-	50.4 sec
5	Unknown	1.731	mUS	-No-	60.4 sec
6	Unknown	0.860	mUS	-No-	69.1 sec
7	Unknown	1.761	mUS	-No-	84.0 sec
8	Unknown	3.463	mUS	-No-	101.4 sec
9	Unknown	4.972	mUS	-No-	114.2 sec

- Detected 19 peaks. Use + + to scroll [594 secl



~~SB4-5.35~~

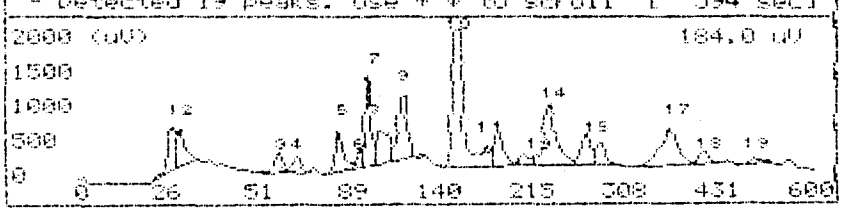
~~10 µl~~

~~11.2g~~

G.C. Ready 105+ GC Function May 16,95 16:32
-- Analysis No 32 -- Run at - May 16,95 16:20 -

Pk No	Name	Area		Alarm	Ret.Time
10	Unknown	22.21	mUS	-No-	144.2 sec
11	Unknown	0.257	mUS	-No-	167.4 sec
12	Unknown	4.497	mUS	-No-	176.4 sec
13	Unknown	1.560	mUS	-No-	196.4 sec
14	Unknown	10.83	mUS	-No-	210.4 sec
15	Unknown	2.396	mUS	-No-	224.4 sec
16	Unknown	3.426	mUS	-No-	260.4 sec
17	Unknown	12.86	mUS	-No-	340.4 sec
18	Unknown	2.448	mUS	-No-	394.4 sec

- Detected 19 peaks. Use + + to scroll [594 secl



G.C. Ready 105+ GC Function May 16,95 16:33
-- Analysis No 32 -- Run at - May 16,95 16:20 -

Pk No	Name	Area		Alarm	Ret.Time
11	Unknown	0.257	mUS	-No-	167.4 sec
12	Unknown	4.497	mUS	-No-	176.4 sec
13	Unknown	1.560	mUS	-No-	196.4 sec
14	Unknown	10.83	mUS	-No-	210.4 sec
15	Unknown	2.396	mUS	-No-	224.4 sec
16	Unknown	3.426	mUS	-No-	260.4 sec
17	Unknown	12.86	mUS	-No-	340.4 sec
18	Unknown	2.448	mUS	-No-	394.4 sec
19	Unknown	2.099	mUS	-No-	482.4 sec

- Detected 19 peaks. Use + + to scroll [594 secl

SB4-5-55

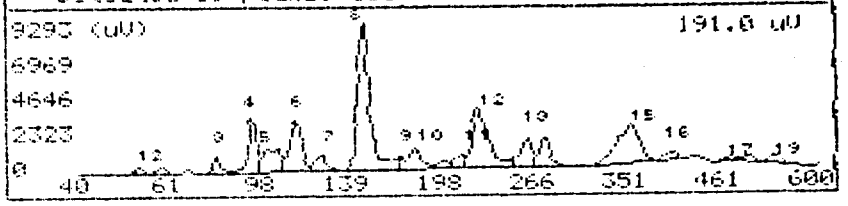
10 ml

8.6g

G.C. Ready 105+ GC Function May 16,95 16:50
-- Analysis No 33 -- Run at - May 16,95 16:24 -

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	0.829	mUS	-No-	57.6 sec
2	Unknown	4.533	mUS	-No-	78.6 sec
3	Unknown	14.02	mUS	-No-	96.1 sec
4	Unknown	13.01	mUS	-No-	99.1 sec
5	Unknown	19.56	mUS	-No-	112.2 sec
6	Unknown	5.050	mUS	-No-	120.1 sec
7	Unknown	67.15	mUS	-No-	141.1 sec
8	Unknown	0.320	mUS	-No-	164.4 sec
10	Unknown	18.30	mUS	-No-	177.8 sec

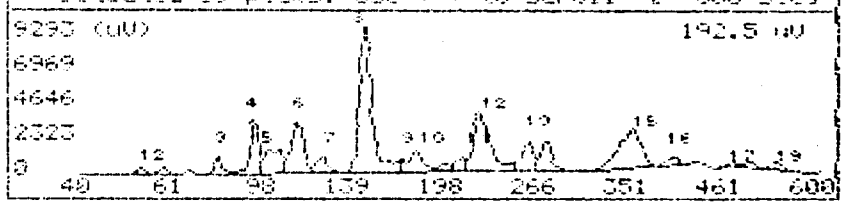
- Detected 19 peaks. Use + + to scroll [605 sec]



G.C. Ready 103+ GC Function May 16,95 16:50
-- Analysis No 33 -- Run at - May 16,95 16:24 -

Pk No	Name	Area		Alarm	Ret.Time
11	Unknown	6.536	mUS	-No-	204.4 sec
12	Unknown	47.11	mUS	-No-	216.4 sec
13	Unknown	21.16	mUS	-No-	240.4 sec
14	Unknown	22.13	mUS	-No-	265.5 sec
15	Unknown	56.05	mUS	-No-	344.5 sec
16	Unknown	7.477	mUS	-No-	368.5 sec
17	Unknown	1.647	mUS	-No-	440.4 sec
18	Unknown	0.741	mUS	-No-	496.4 sec
19	Unknown	0.570	mUS	-No-	521.0 sec

- Detected 19 peaks. Use + + to scroll [605 sec]

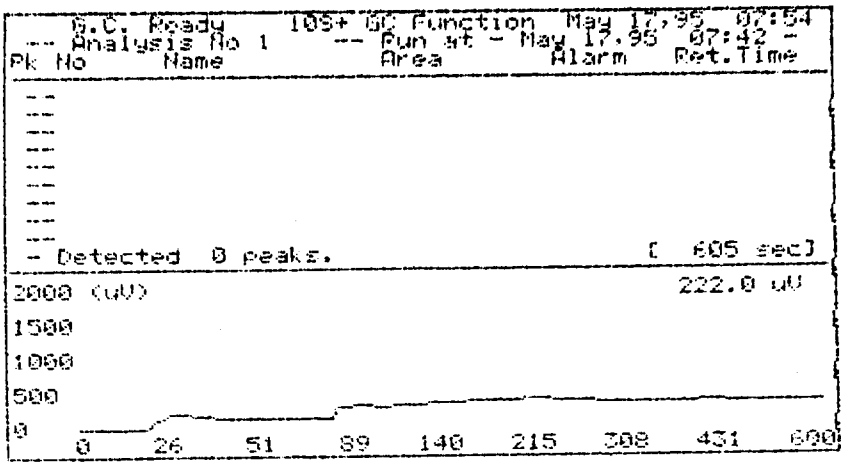


GC Data (5/16/95)

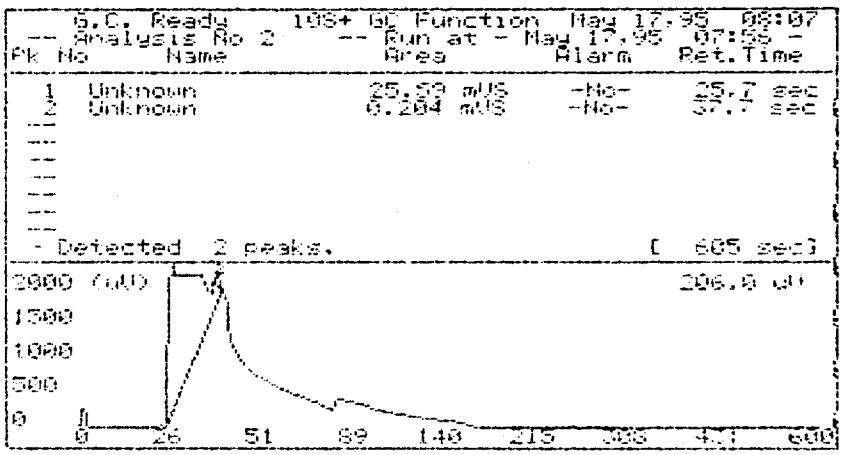
SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
SB4-5-5.5	90.8	68.7	228.1	110.1	145.8	0.0	0.0	643.5
SB4-5-3.5	4.0	18.7	47.6	22.9	36.7	0.0	0.0	129.8
SB4-6-10	4.6	38.7	323.5	301.0	434.3	604.9	0.0	1707.0
MW08-95-2	0.0	1.1	0.0	0.0	0.0	0.0	0.0	1.1
MW06-95-2	15.1	6.4	2.1	5.0	14.9	0.0	0.0	43.6
MW06-95-2*	14.7	7.3	2.7	4.2	13.8	0.0	0.0	42.7
MW07-95-2	89.2	124.2	138.5	0.0	281.5	0.0	357.7	991.1

5/17/95

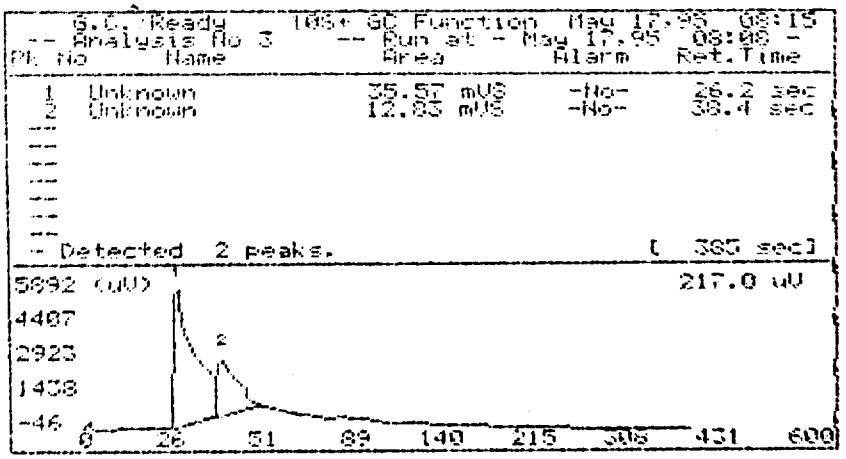
Machine Blank



Syringe Blank A

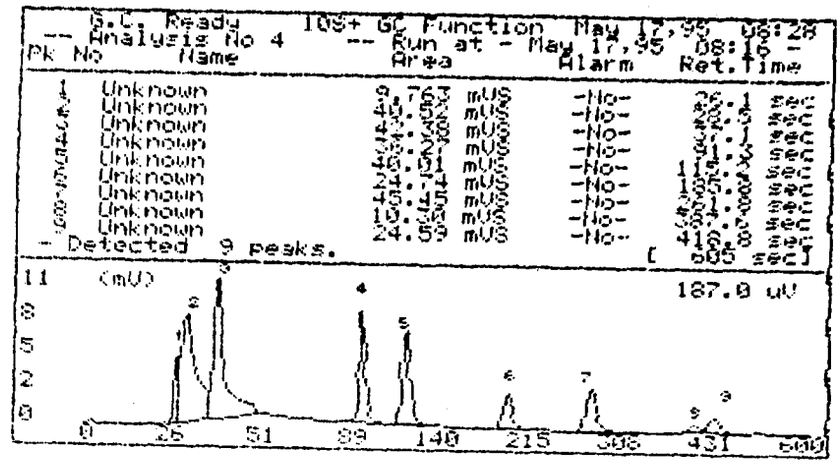


Syringe Blank B



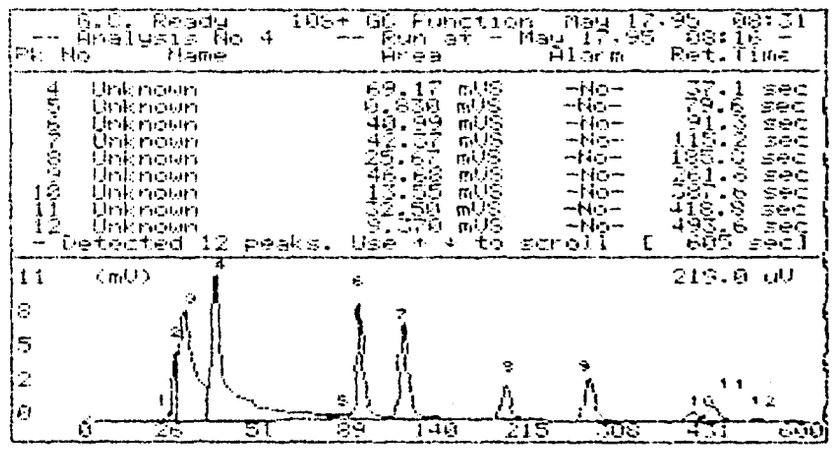
10 ug/L Std

250 ul



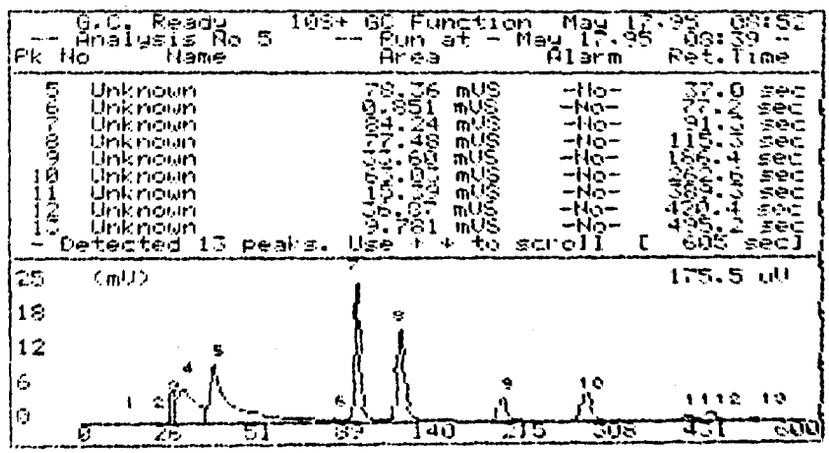
50 ug/L

100 ul

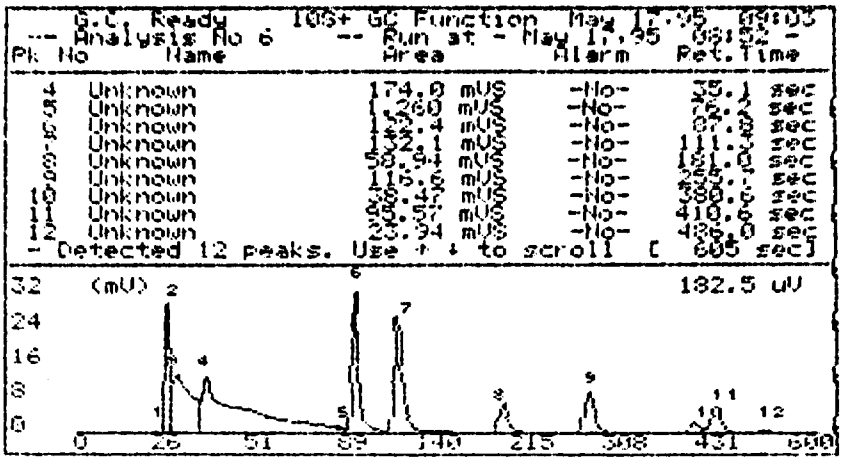


50 ug/L

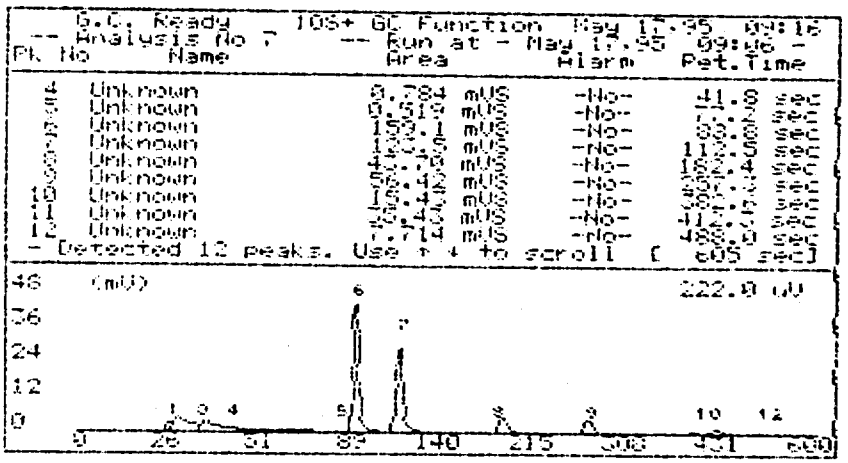
100 ul



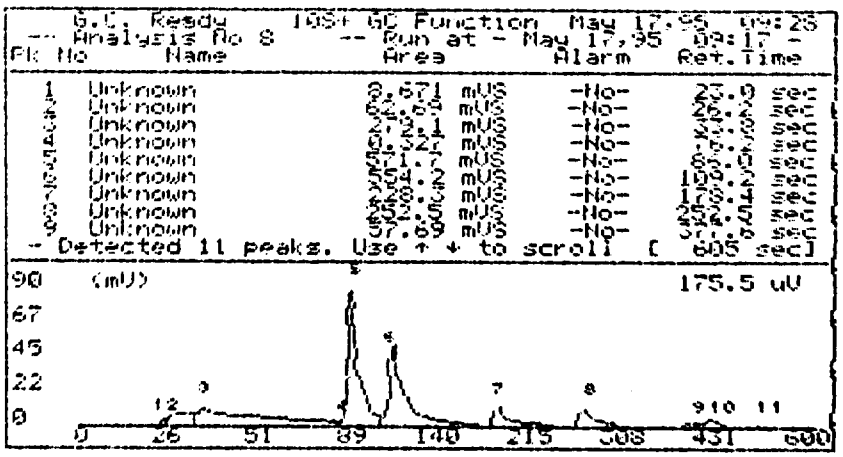
50 ug/l
100 ul



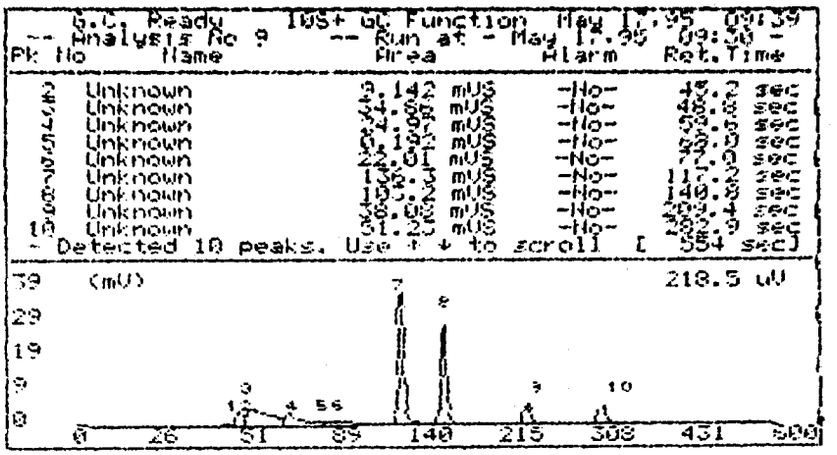
500 ug/l
25 ul



500 ug/l
25 ul

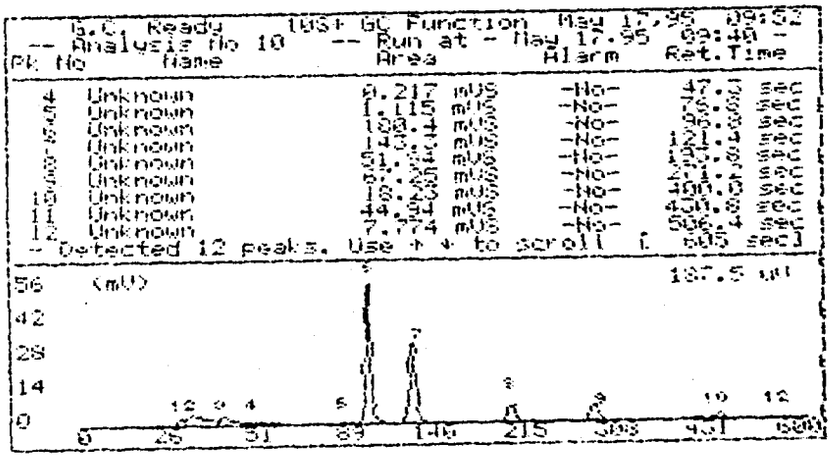


500 ug/l
25 ul

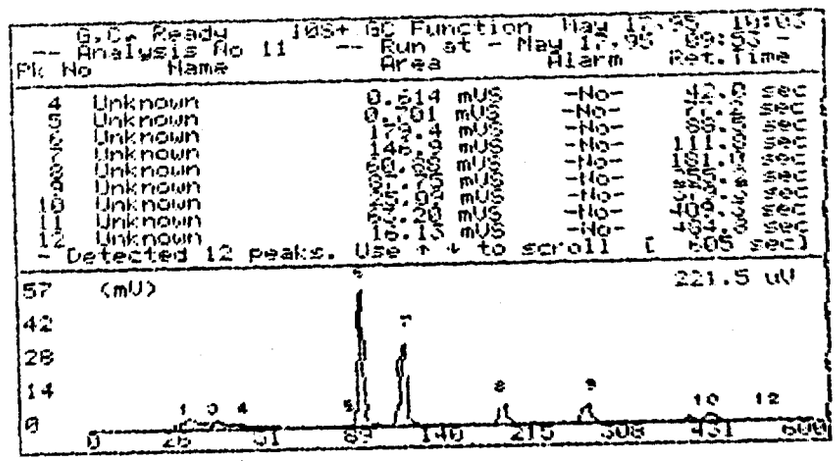


B 11B
b "R

500 ug/l
25 ul



500 ug/l
25 ul

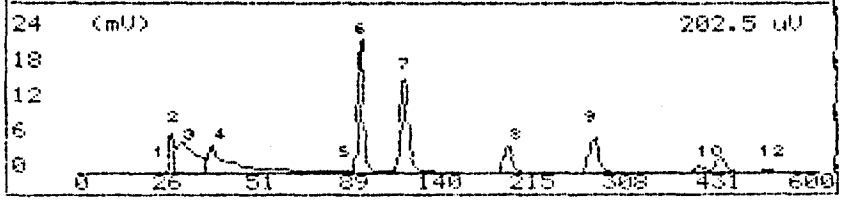


50 ug/l
100 ul

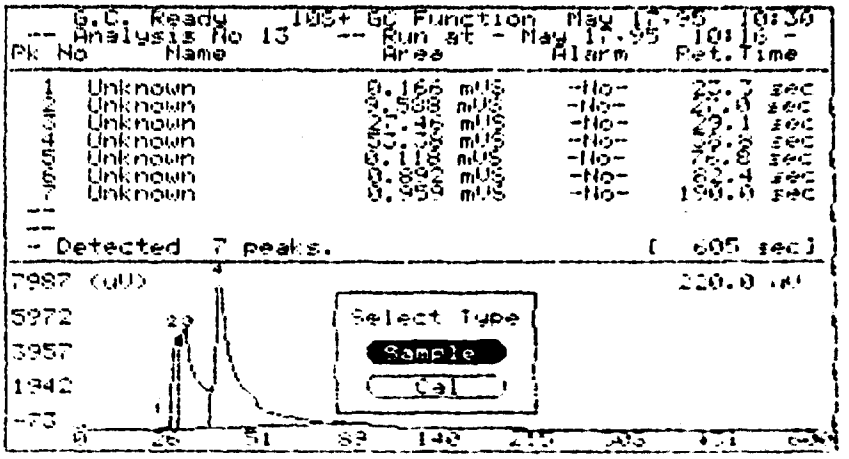
G.C. Ready 100+ GC Function May 17.95 10:15
-- Analysis No 12 -- Run at - May 17.95 10:04 -

Pk No	Name	Area		Alarm	Ret.Time
4	Unknown	42.27	mUS	-No-	36.4 sec
5	Unknown	0.552	mUS	-No-	78.1 sec
6	Unknown	55.83	mUS	-No-	90.5 sec
7	Unknown	74.87	mUS	-No-	114.4 sec
8	Unknown	45.98	mUS	-No-	185.0 sec
9	Unknown	43.33	mUS	-No-	260.2 sec
10	Unknown	16.44	mUS	-No-	386.0 sec
11	Unknown	51.87	mUS	-No-	416.0 sec
12	Unknown	13.15	mUS	-No-	492.4 sec

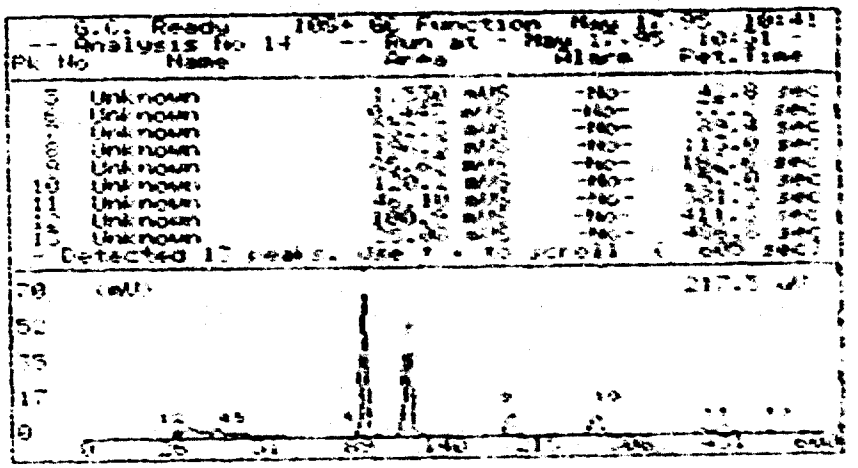
- Detected 12 peaks. Use ↑ ↓ to scroll [605 sec]



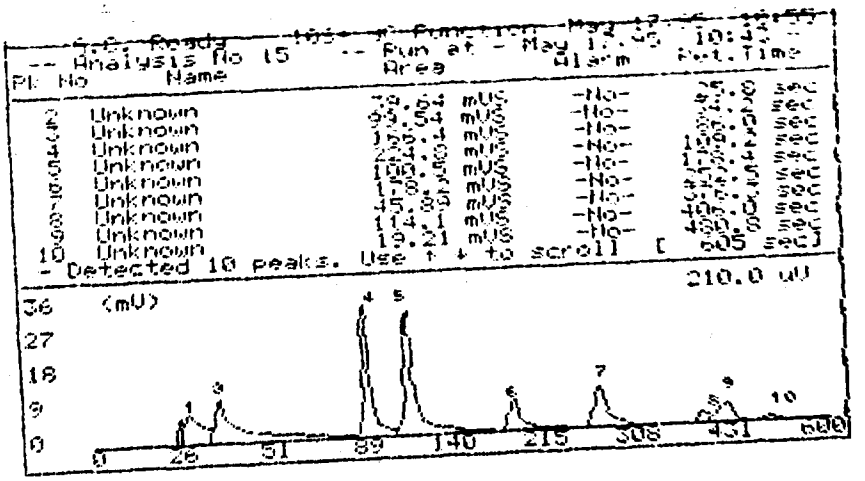
Method Blank



50 ug/l
25 ul



50 ug/l
100 ul

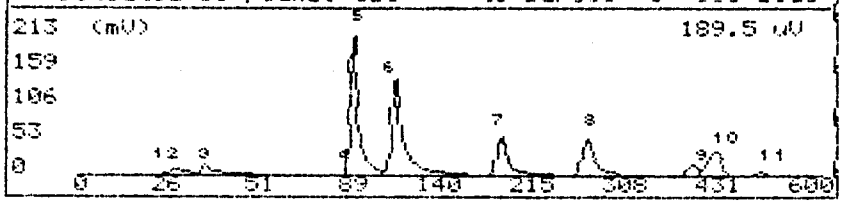


500 ug/l
50 ul

G.C. Ready 10S+ GC Function May 17,95 11:11
-- Analysis No 16 -- Run at - May 17,95 10:56 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	9.626 mVS	-No-	22.2 sec
2	Unknown	59.59 mVS	-No-	28.2 sec
3	Unknown	159.9 mVS	-No-	34.2 sec
4	Unknown	1.094 mVS	-No-	76.2 sec
5	Unknown	1.084 USec	-No-	86.2 sec
6	Unknown	1.147 USec	-No-	100.2 sec
7	Unknown	732.1 mVS	-No-	178.2 sec
8	Unknown	945.5 mVS	-No-	452.2 sec
9	Unknown	300.1 mVS	-No-	377.2 sec

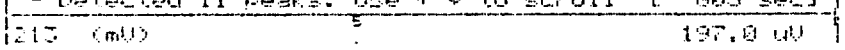
-- Detected 11 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 10S+ GC Function May 17,95 11:12
-- Analysis No 16 -- Run at - May 17,95 10:56 -

Pk No	Name	Area	Alarm	Ret.Time
3	Unknown	159.9 mVS	-No-	34.2 sec
4	Unknown	1.094 mVS	-No-	76.2 sec
5	Unknown	1.084 USec	-No-	86.2 sec
6	Unknown	1.147 USec	-No-	100.2 sec
7	Unknown	732.1 mVS	-No-	178.2 sec
8	Unknown	945.5 mVS	-No-	452.2 sec
9	Unknown	300.1 mVS	-No-	377.2 sec
10	Unknown	969.1 mVS	-No-	407.0 sec
11	Unknown	173.0 mVS	-No-	482.0 sec

- Detected 11 peaks. Use ↑ ↓ to scroll [605 sec]



SB4-5-7.5

25 ul

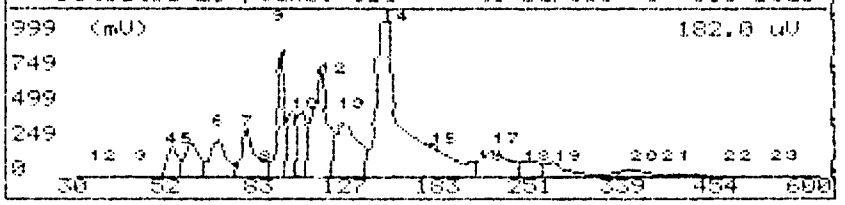
11.1

G.C. Ready 10S+ GC Function May 17,95 11:28
-- Analysis No 17 -- Run at - May 17,95 11:13 -

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	8.655	mUS	-No-	327.4 sec
2	Unknown	17.187	mUS	-No-	340.6 sec
3	Unknown	6.147	mUS	-No-	344.5 sec
4	Unknown	69.1	mUS	-No-	354.1 sec
5	Unknown	93.6	mUS	-No-	365.6 sec
6	Unknown	1.469	USec	-No-	372.6 sec
7	Unknown	3.577	USec	-No-	376.4 sec
8	Unknown	45.961	mUS	-No-	385.4 sec
9	Unknown	3.352	USec	-No-	391.4 sec

- Detected 23 peaks. Use ↑ ↓ to scroll [605 sec]

B



G.C. Ready 10S+ GC Function May 17,95 11:50
-- Analysis No 17 -- Run at - May 17,95 11:13 -

Pk No	Name	Area		Alarm	Ret.Time
10	Unknown	2.025	USec	-No-	96.9 sec
11	Unknown	3.110	USec	-No-	101.6 sec
12	Unknown	0.577	USec	-No-	110.0 sec
13	Unknown	4.246	USec	-No-	120.3 sec
14	Unknown	23.227	USec	-No-	152.7 sec
15	Unknown	176.9	mUS	-No-	169.4 sec
16	Unknown	46.778	mUS	-No-	200.0 sec
17	Unknown	4.155	USec	-No-	212.4 sec
18	Unknown	1.904	USec	-No-	243.4 sec

- Detected 23 peaks. Use ↑ ↓ to scroll [605 sec]

TCE

G.C. Ready 10S+ GC Function May 17,95 11:31
-- Analysis No 17 -- Run at - May 17,95 11:13 -

Pk No	Name	Area		Alarm	Ret.Time
15	Unknown	176.9	mUS	-No-	169.4 sec
16	Unknown	46.778	mUS	-No-	200.0 sec
17	Unknown	4.155	USec	-No-	212.4 sec
18	Unknown	1.904	USec	-No-	243.4 sec
19	Unknown	2.501	USec	-No-	261.0 sec
20	Unknown	2.079	USec	-No-	288.3 sec
21	Unknown	852.0	mUS	-No-	301.0 sec
22	Unknown	314.1	mUS	-No-	455.7 sec
23	Unknown	162.8	mUS	-No-	512.9 sec

- Detected 23 peaks. Use ↑ ↓ to scroll [605 sec]

SB4-5-9.0

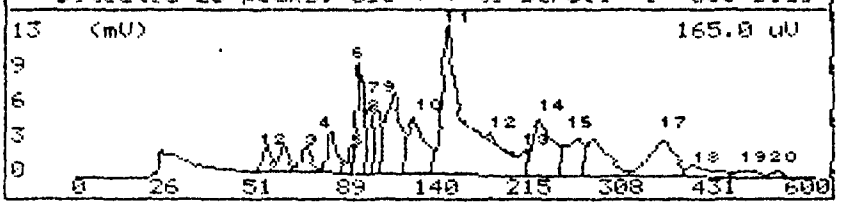
25 ul

8.49

G.C. Ready 10S+ GC Function May 17,95 11:48
-- Analysis No 18 -- Run at - May 17,95 11:35 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	6.086	mUS	-No-	51.9 sec	
2	Unknown	7.193	mUS	-No-	58.5 sec	
3	Unknown	9.868	mUS	-No-	62.5 sec	
4	Unknown	15.15	mUS	-No-	74.5 sec	
5	Unknown	8.933	mUS	-No-	86.0 sec	
6	Unknown	44.21	mUS	-No-	91.3 sec	— B
7	Unknown	28.69	mUS	-No-	96.9 sec	
8	Unknown	25.43	mUS	-No-	101.4 sec	
9	Unknown	66.36	mUS	-No-	109.8 sec	— TCE

- Detected 20 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 10S+ GC Function May 17,95 11:49
-- Analysis No 18 -- Run at - May 17,95 11:35 -

Pk No	Name	Area		Alarm	Ret.Time
10	Unknown	52.85	mUS	-No-	120.6 sec
11	Unknown	82.7	mUS	-No-	133.4 sec
12	Unknown	3.594	mUS	-No-	170.0 sec
13	Unknown	1.234	mUS	-No-	201.2 sec
14	Unknown	101.2	mUS	-No-	213.0 sec
15	Unknown	62.94	mUS	-No-	245.0 sec
16	Unknown	88.71	mUS	-No-	261.8 sec
17	Unknown	122.8	mUS	-No-	340.0 sec
18	Unknown	42.26	mUS	-No-	383.0 sec

- Detected 20 peaks. Use ↑ ↓ to scroll [605 sec]

G.C. Ready 10S+ GC Function May 17,95 11:49
-- Analysis No 18 -- Run at - May 17,95 11:35 -

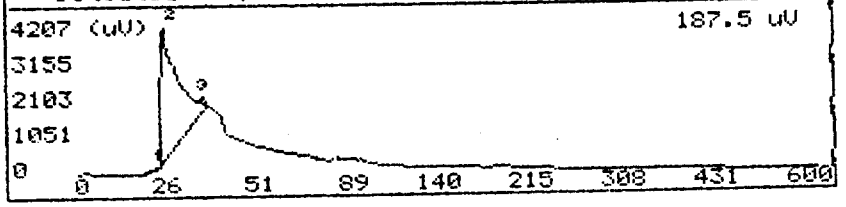
Pk No	Name	Area		Alarm	Ret.Time
12	Unknown	3.594	mUS	-No-	170.0 sec
13	Unknown	1.234	mUS	-No-	201.2 sec
14	Unknown	101.2	mUS	-No-	213.0 sec
15	Unknown	62.94	mUS	-No-	245.0 sec
16	Unknown	88.71	mUS	-No-	261.8 sec
17	Unknown	122.8	mUS	-No-	340.0 sec
18	Unknown	42.26	mUS	-No-	383.0 sec
19	Unknown	24.01	mUS	-No-	458.0 sec
20	Unknown	11.59	mUS	-No-	516.2 sec

- Detected 20 peaks. Use ↑ ↓ to scroll [605 sec]

SB4-4-1.5

100 ul

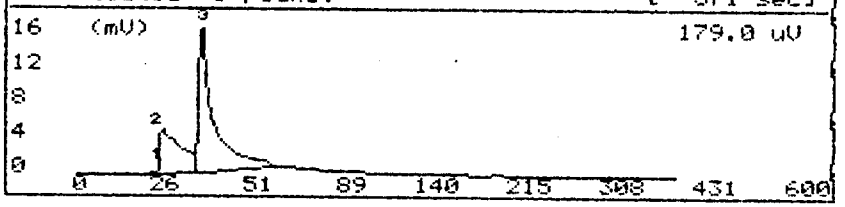
```
   G.C. Ready      10S+ GC Function  May 17,95  12:08
-- Analysis No 19    -- Run at - May 17,95  11:57 -
Pk No      Name            Area          Alarm    Ret.Time
  1   Unknown          0.098 mUS        -No-      20.4 sec
  2   Unknown          19.08 mUS        -No-      23.5 sec
  3   Unknown          0.207 mUS        -No-      34.4 sec
 --
 --
 --
 --
 --
- Detected  3 peaks.                          [  605 sec]
```



34-4-3.5

100 ul

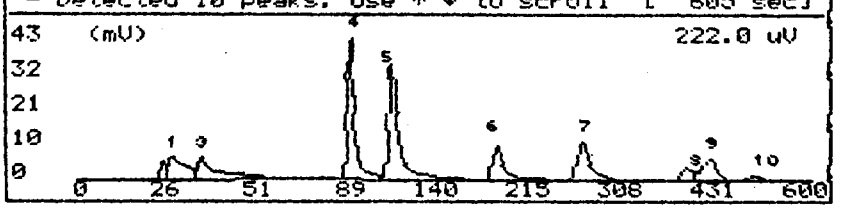
```
   G.C. Ready      10S+ GC Function  May 17,95  12:19
-- Analysis No 20    -- Run at - May 17,95  12:13 -
Pk No      Name            Area          Alarm    Ret.Time
  1   Unknown          0.140 mUS        -No-      20.6 sec
  2   Unknown          31.68 mUS        -No-      23.3 sec
  3   Unknown          74.62 mUS        -No-      34.1 sec
 --
 --
 --
 --
 --
- Detected  3 peaks.                          [  371 sec]
```

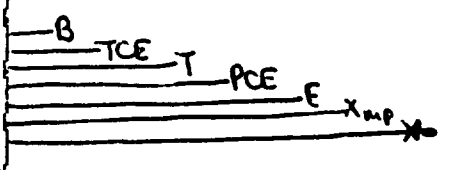


50 ng/l

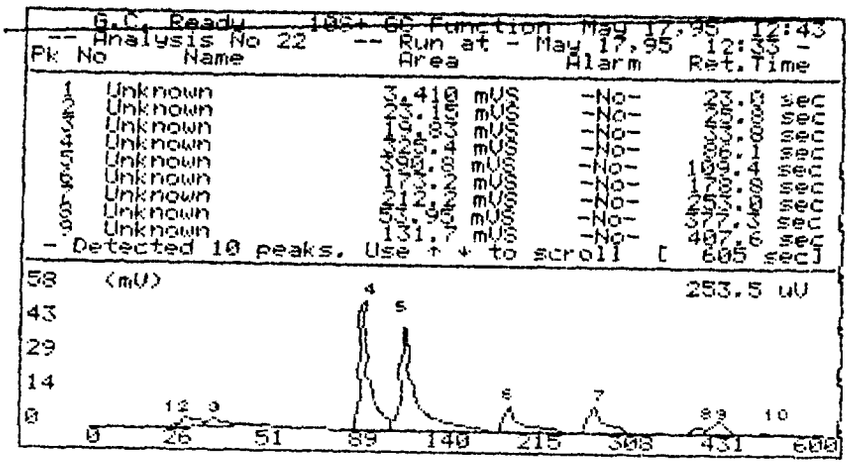
100 ul

```
   G.C. Ready      10S+ GC Function  May 17,95  12:31
-- Analysis No 21    -- Run at - May 17,95  12:21 -
Pk No      Name            Area          Alarm    Ret.Time
  2   Unknown          35.54 mUS        -No-      26.1 sec
  3   Unknown          38.50 mUS        -No-      34.2 sec
  4   Unknown          189.3 mUS        -No-      56.4 sec
  5   Unknown          226.4 mUS        -No-     100.6 sec
  6   Unknown          121.0 mUS        -No-     179.2 sec
  7   Unknown          191.9 mUS        -No-     [illegible] sec
  8   Unknown          65.96 mUS        -No-     [illegible] sec
  9   Unknown          161.2 mUS        -No-     407.6 sec
 10   Unknown          27.66 mUS        -No-     491.6 sec
- Detected 10 peaks. Use ↑ ↓ to scroll  [  605 sec]
```

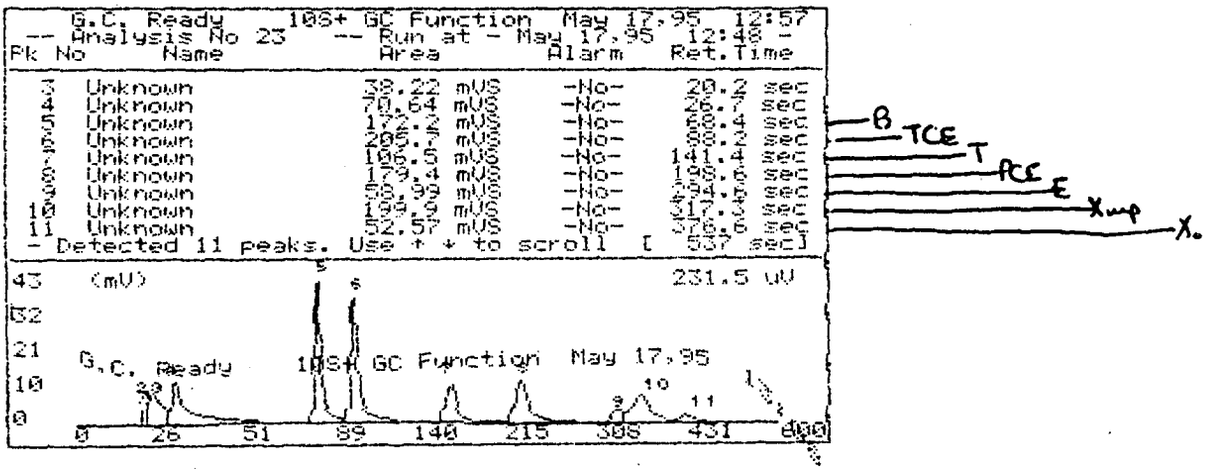


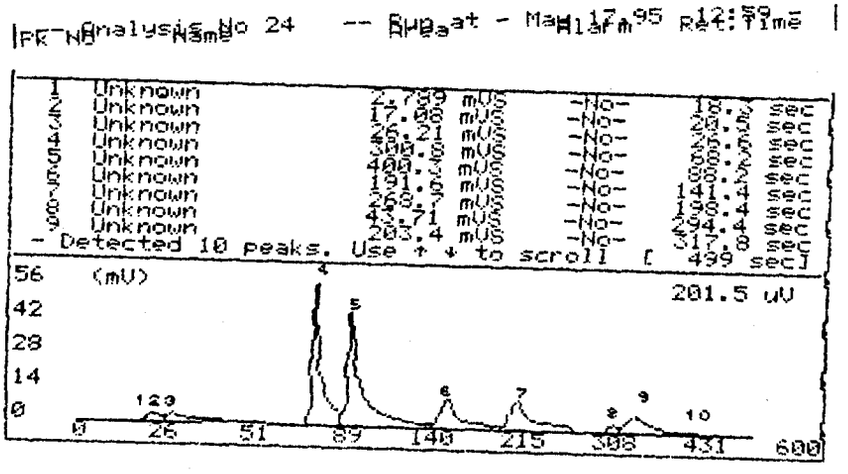


500 ug/l
20 ul



50 ug/l
100 ul





500 ug/l
20 ul

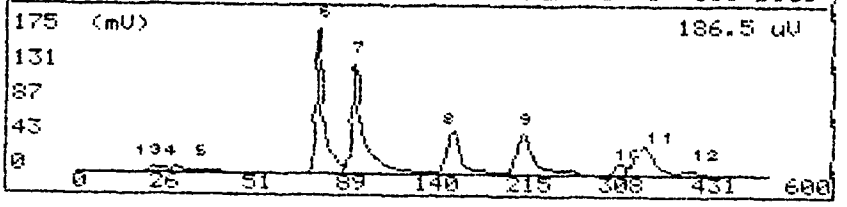
500 ug/l

50 ul

G.C. Ready 10S+ GC Function May 17,95 13:18
-- Analysis No 25 -- Run at - May 17,95 13:09 -

Pk No	Name	Area	Alarm	Ret.Time
4	Unknown	47.93 mUS	-No-	27.0 sec
5	Unknown	0.391 mUS	-No-	32.0 sec
6	Unknown	858.0 mUS	-No-	68.0 sec
7	Unknown	1.000 USec	-No-	100.0 sec
8	Unknown	624.6 mUS	-No-	141.0 sec
9	Unknown	887.2 mUS	-No-	199.0 sec
10	Unknown	197.3 mUS	-No-	295.2 sec
11	Unknown	850.4 mUS	-No-	410.1 sec
12	Unknown	184.3 mUS	-No-	477.0 sec

- Detected 12 peaks. Use ↑ ↓ to scroll [513 sec]



SB4-4-5.5

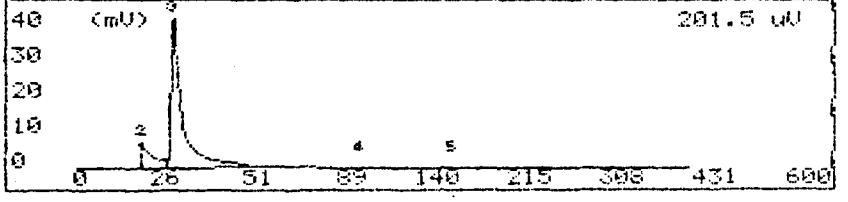
100 ul

11.2

G.C. Ready 10S+ GC Function May 17,95 13:29
-- Analysis No 26 -- Run at - May 17,95 13:22 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.268 mUS	-No-	15.8 sec
2	Unknown	24.20 mUS	-No-	18.1 sec
3	Unknown	137.3 mUS	-No-	26.4 sec
4	Unknown	0.772 mUS	-No-	88.1 sec
5	Unknown	0.734 mUS	-No-	141.8 sec

- Detected 5 peaks. [388 sec]



SB4-4-7.5

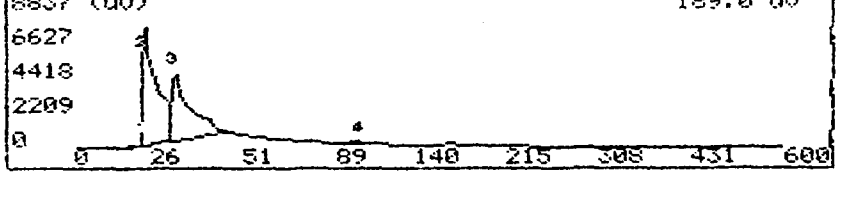
100 ul

10.6

G.C. Ready 10S+ GC Function May 17,95 13:39
-- Analysis No 27 -- Run at - May 17,95 13:30 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.238 mUS	-No-	16.3 sec
2	Unknown	29.99 mUS	-No-	18.4 sec
3	Unknown	22.64 mUS	-No-	26.8 sec
4	Unknown	0.835 mUS	-No-	87.3 sec

- Detected 4 peaks. [538 sec]



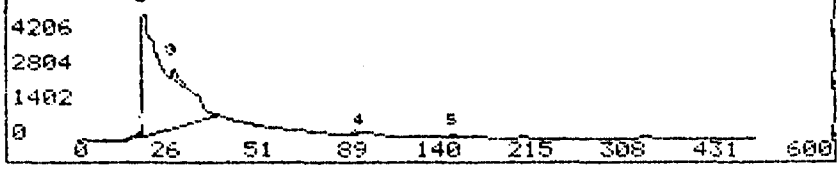
SB4-4-8.5

100 ul

G.C. Ready 10S+ GC Function May 17,95 13:49
-- Analysis No 28 -- Run at - May 17,95 13:41 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.152 mUS	-No-	16.1 sec
2	Unknown	36.44 mUS	-No-	18.2 sec
3	Unknown	0.709 mUS	-No-	26.6 sec
4	Unknown	0.948 mUS	-No-	88.6 sec
5	Unknown	0.767 mUS	-No-	140.9 sec

- Detected 5 peaks. [489 sec]



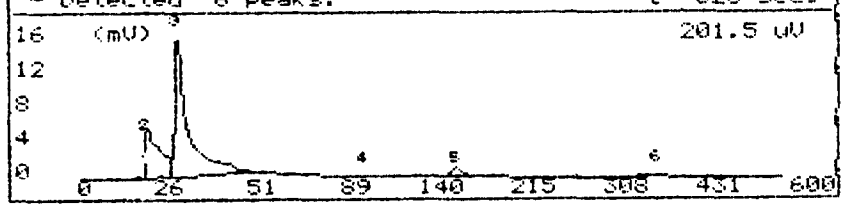
SB-4-3-1.5

100 ul

G.C. Ready 10S+ GC Function May 17,95 14:00
-- Analysis No 29 -- Run at - May 17,95 13:51 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.223 mUS	-No-	16.1 sec
2	Unknown	25.86 mUS	-No-	18.2 sec
3	Unknown	63.18 mUS	-No-	26.7 sec
4	Unknown	0.838 mUS	-No-	87.8 sec
5	Unknown	8.071 mUS	-No-	142.0 sec
6	Unknown	2.748 mUS	-No-	318.4 sec

- Detected 6 peaks. [525 sec]



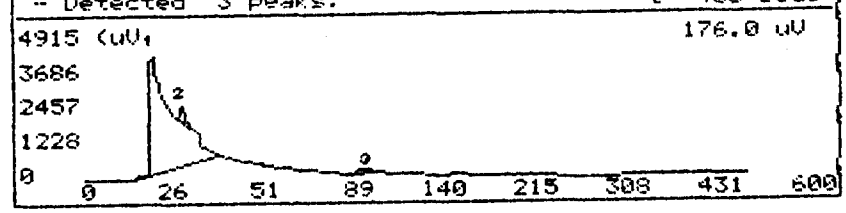
SB4-3-3.5

100 ul

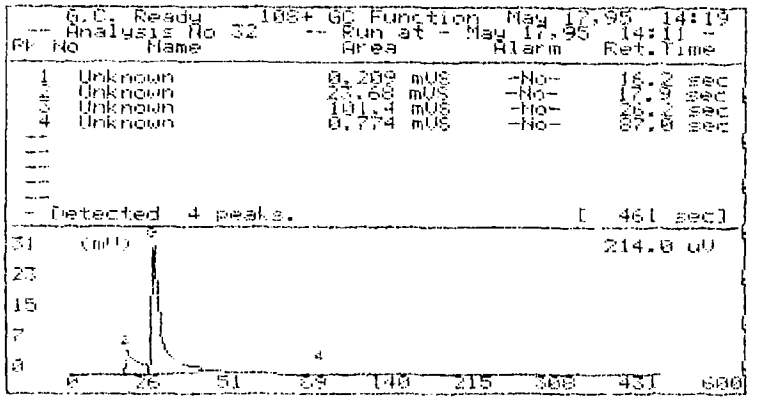
G.C. Ready 10S+ GC Function May 17,95 14:09
-- Analysis No 30 -- Run at - May 17,95 14:01 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	29.72 mUS	-No-	18.2 sec
2	Unknown	0.781 mUS	-No-	26.6 sec
3	Unknown	0.949 mUS	-No-	88.6 sec

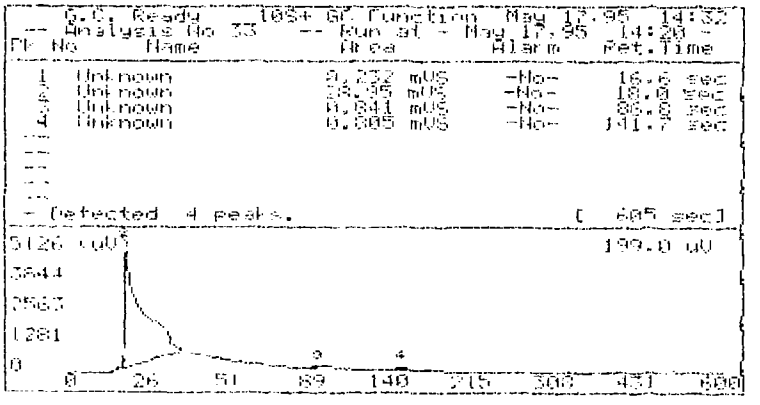
- Detected 3 peaks. [465 sec]



SB4-3-5.5
100 ul

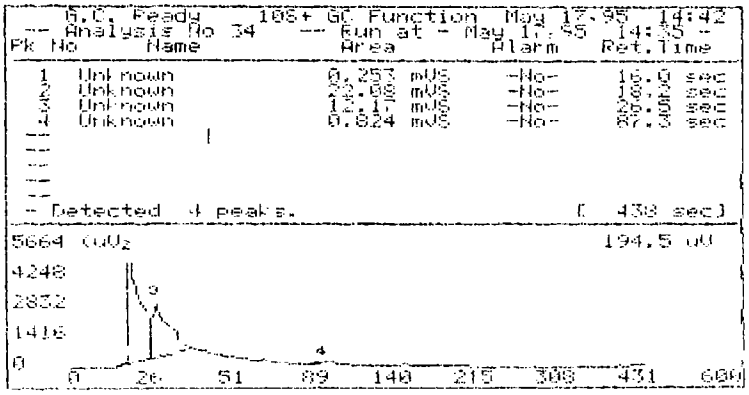


SB4-2-2.0
100 ul



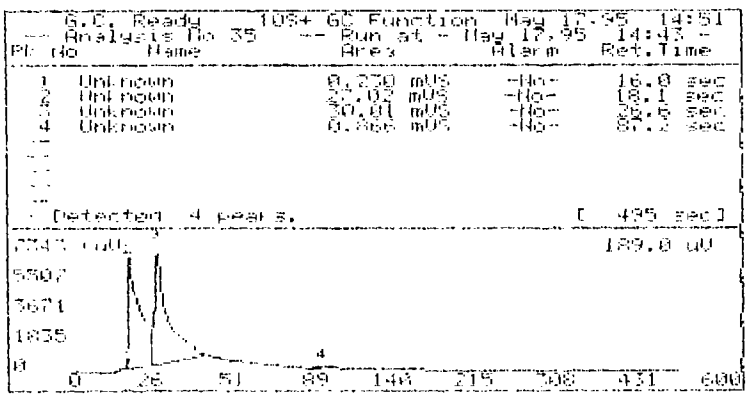
SB4-2-3.5

100 ul



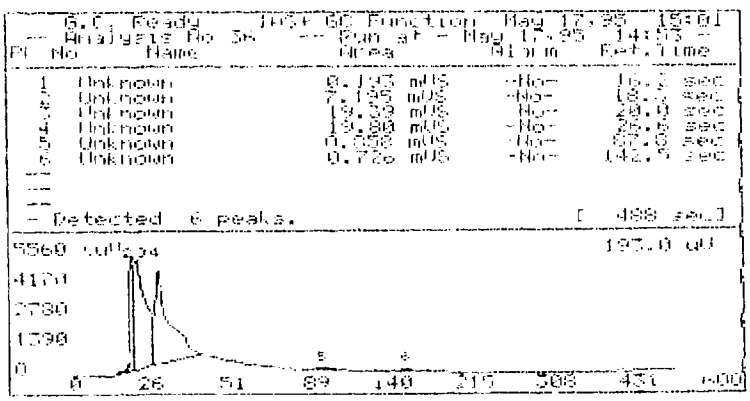
SB4-2-5.5

100 ul

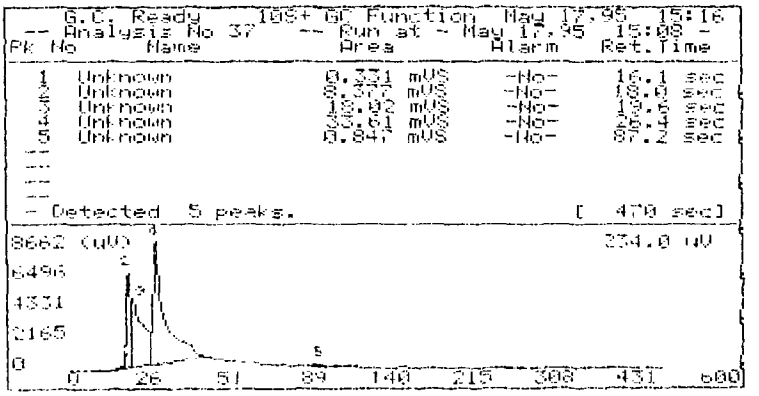


SB4-2-7.5

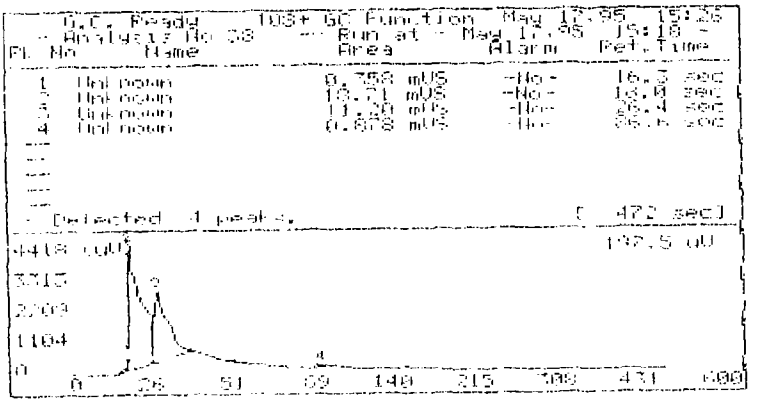
100 ul



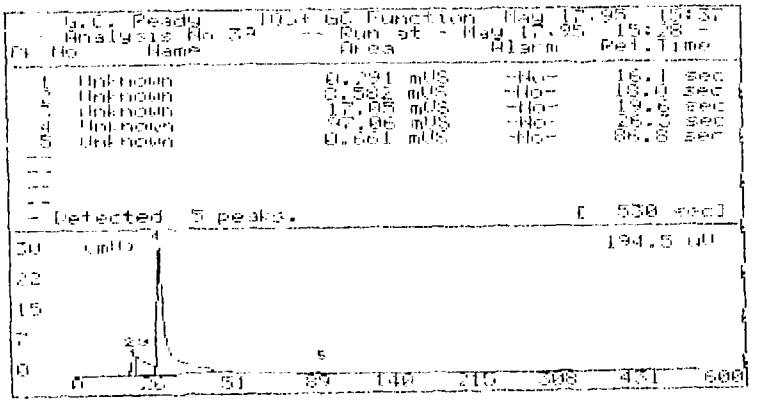
SB4-7-1.5
100 ul



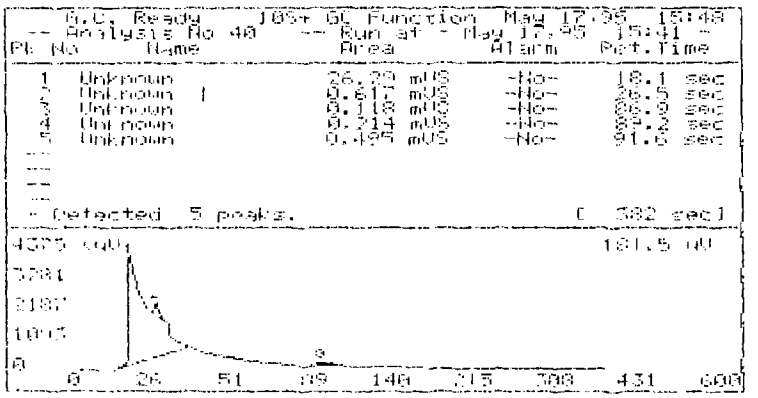
SB4-7-3.5
100 ul



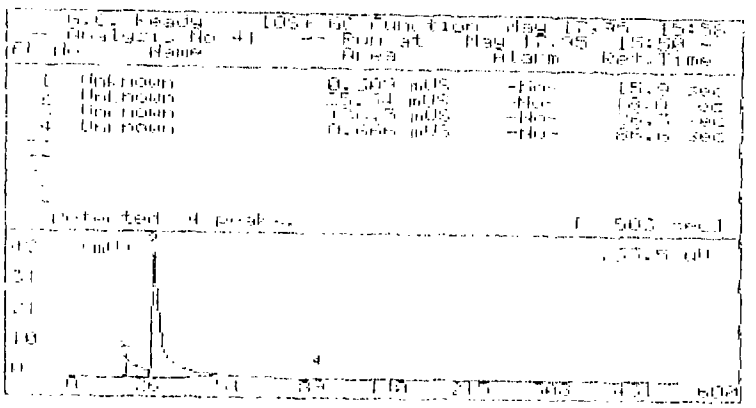
SB4-7-5.5
100 ul



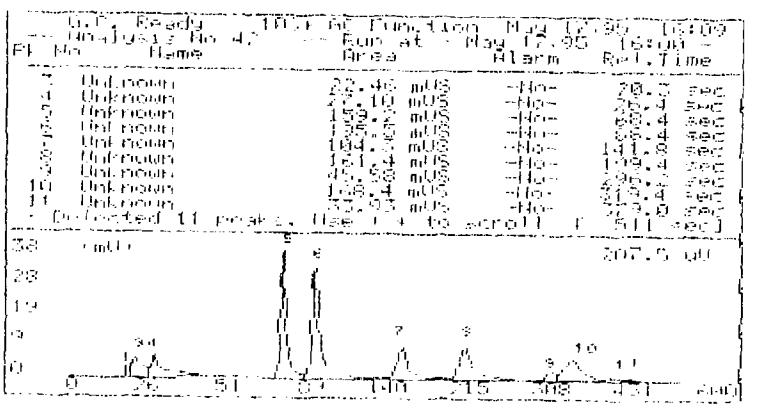
SB4-7-7.5
100 ul



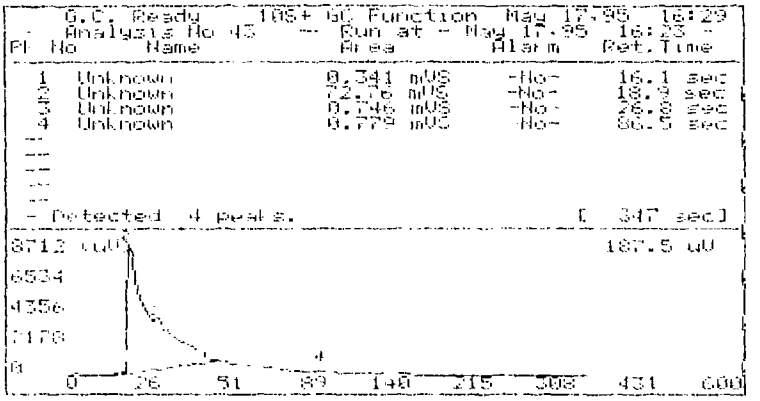
SB4-6-11.5
100 ul



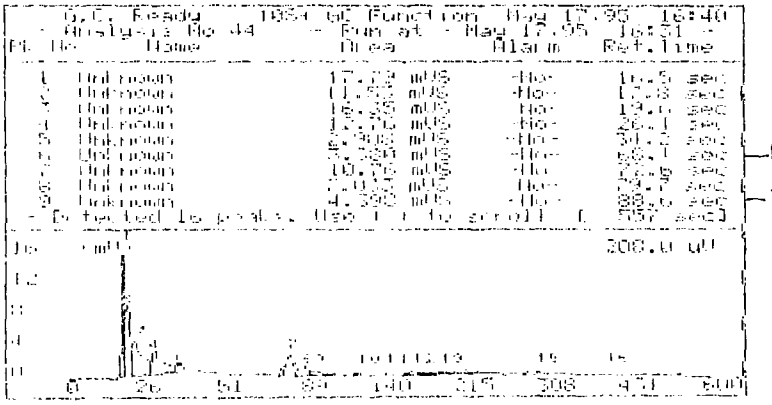
50 ug/l
100



syringe Blank 250 A

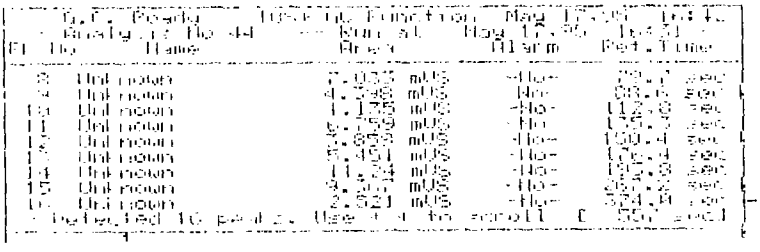


MW17-95-2 50 ul



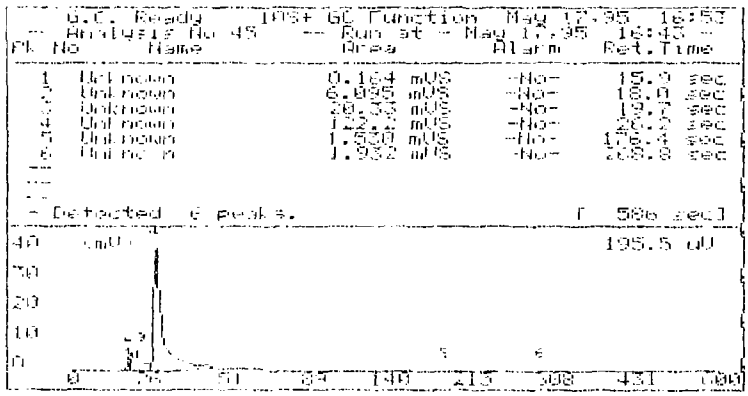
B

TCE

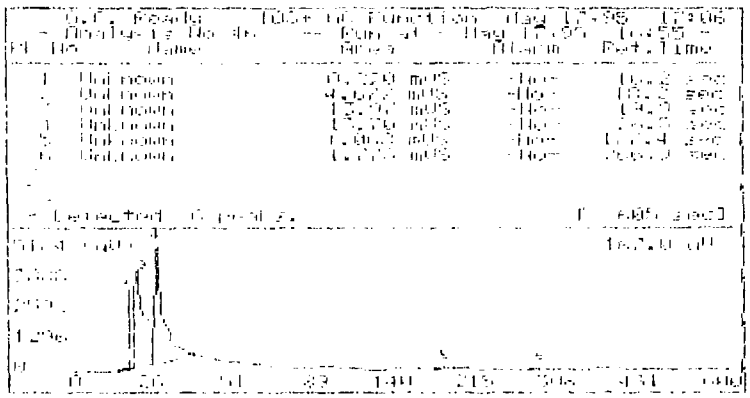


Xo

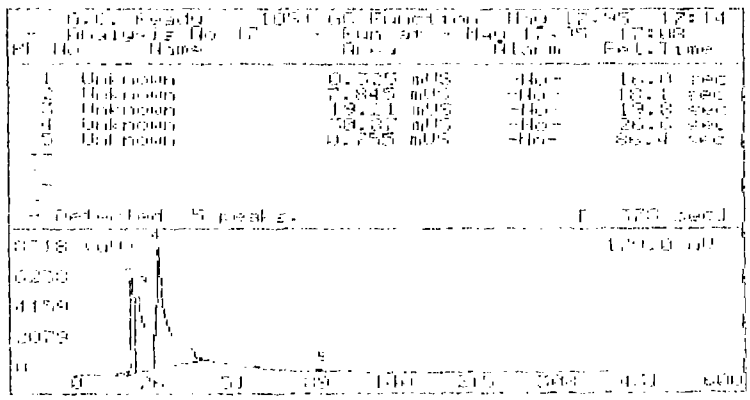
MW18-95-2*
100 ul



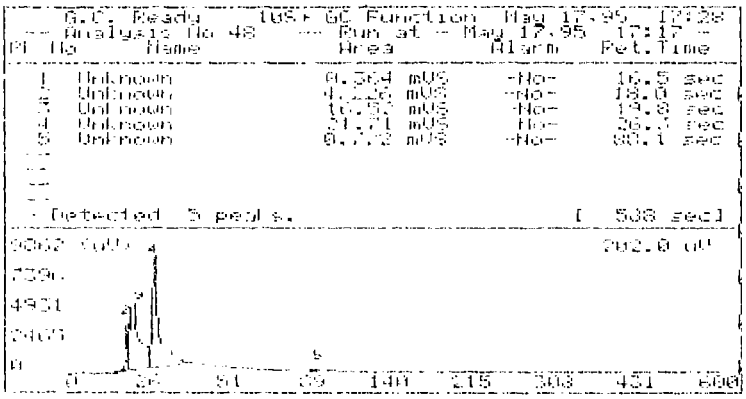
MW18-95-2
100 ul



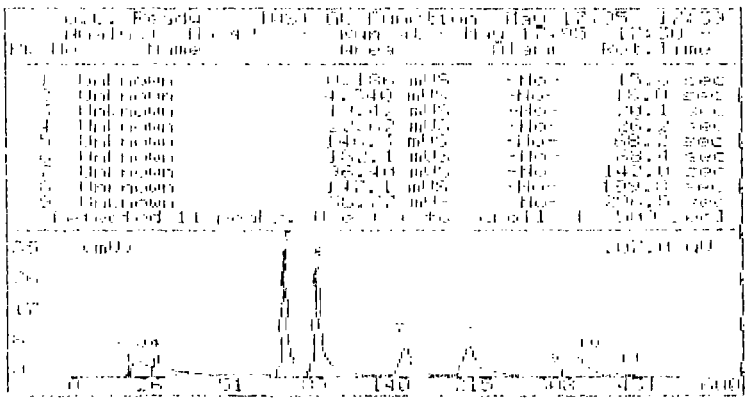
MW10-95-2
100 ul

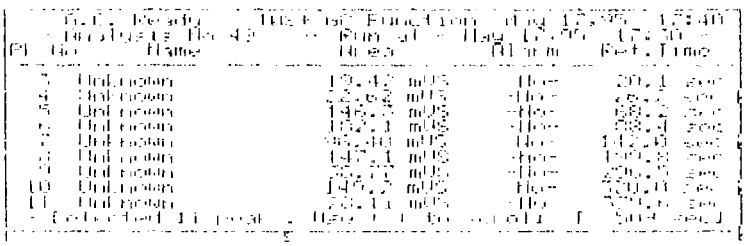


MW10-95-2x
100 ul



50 ug/l
100 ul





GC Data (5/17/95) am

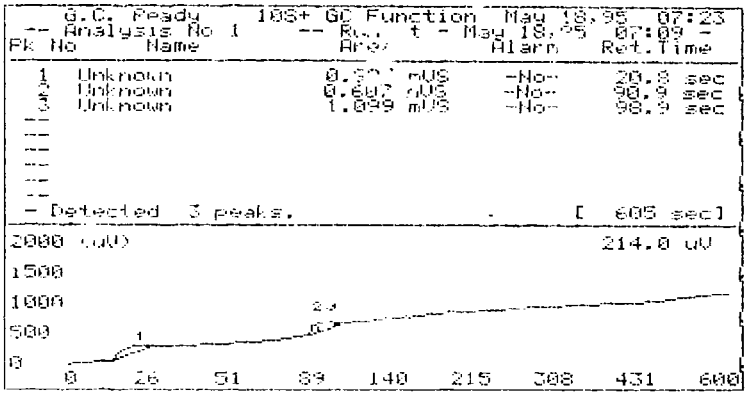
SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
SB4-5-7.5	19.0	8.9	0.0	0.0	0.0	0.0	0.0	27.9
SB4-5-9	22.5	139.6	0.0	0.0	0.0	0.0	0.0	162.0

GC Data (5/17/95) pm

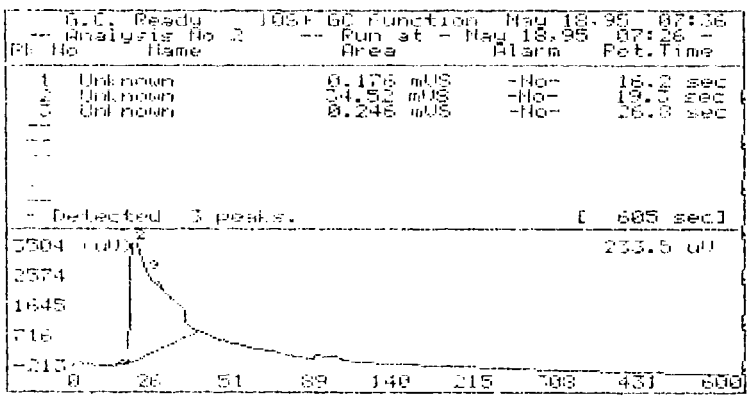
SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
MW17-95-2	1.8	1.9	0.0	0.0	0.0	0.0	91.1	94.9

5/18/95

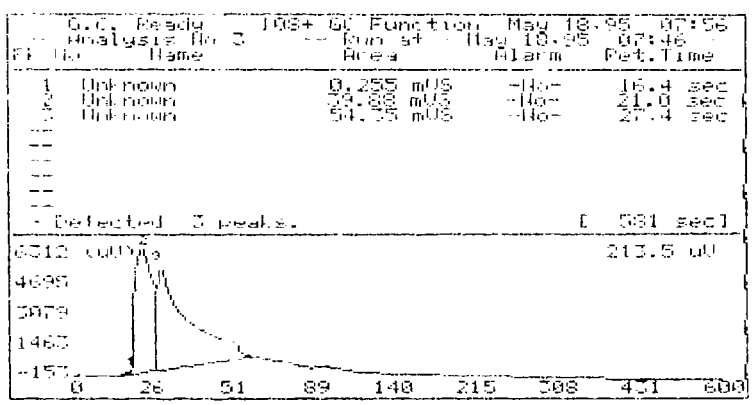
Machine Blank



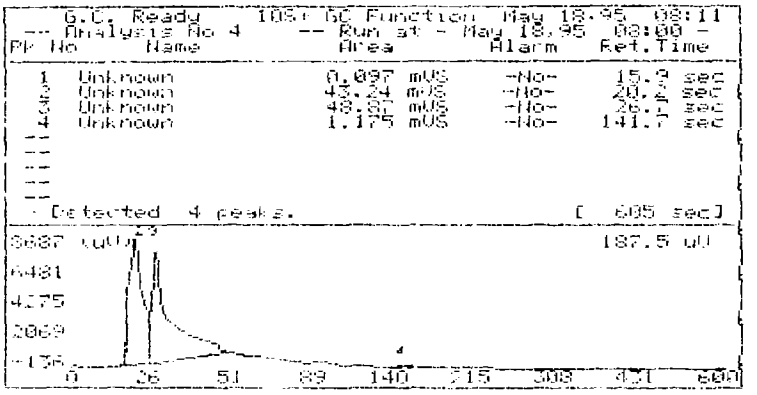
Syringe Blank 250A



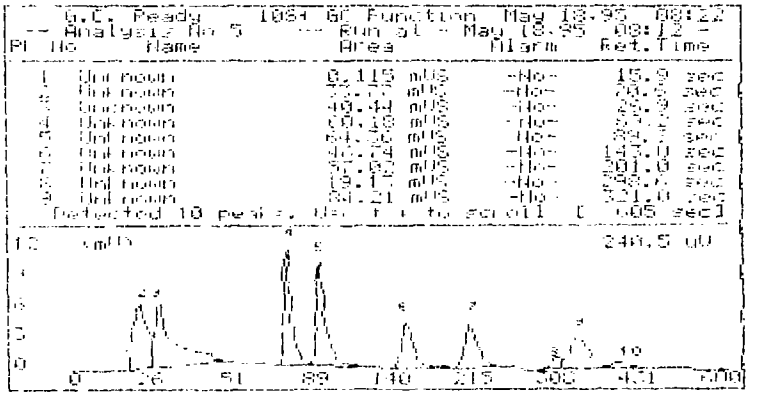
Syringe Blank 250B

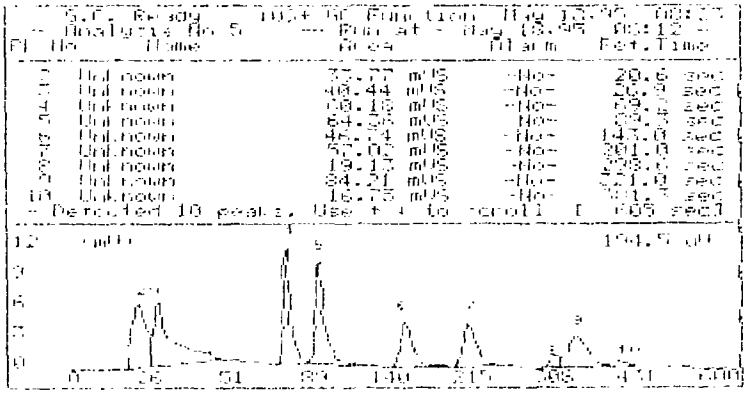


Method Blank

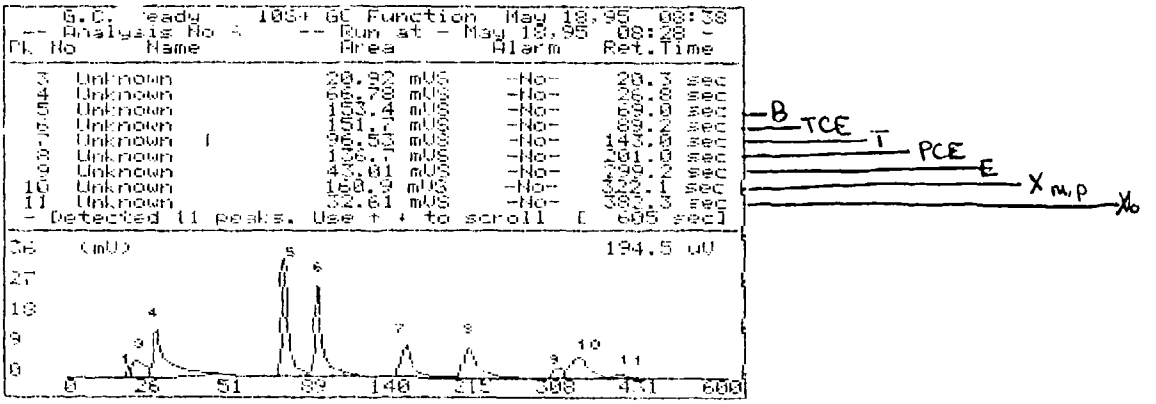


10 ug/l
250 ul

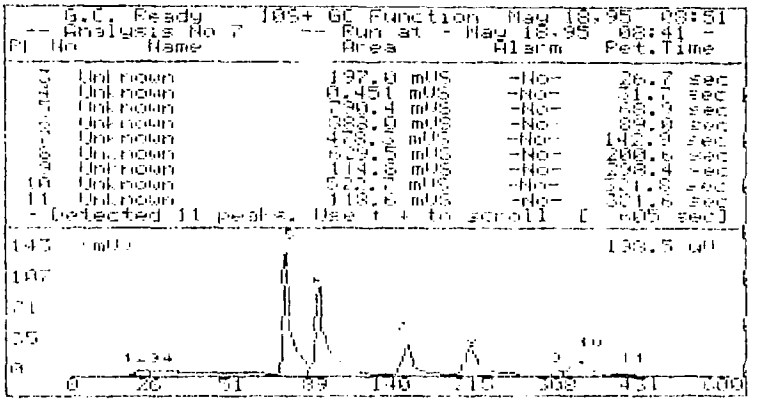




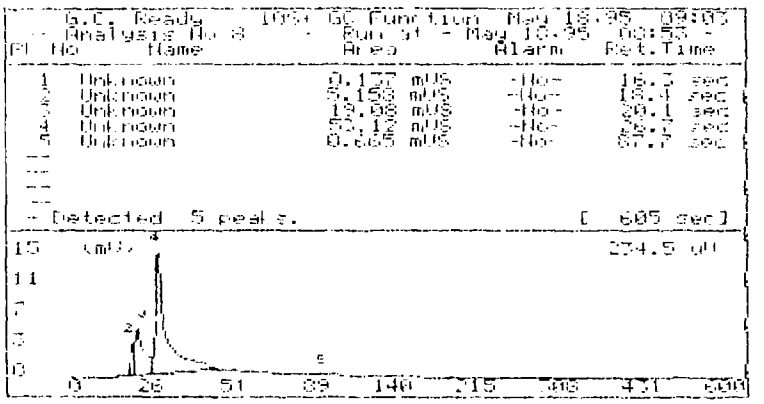
50 ug/l
10c ul



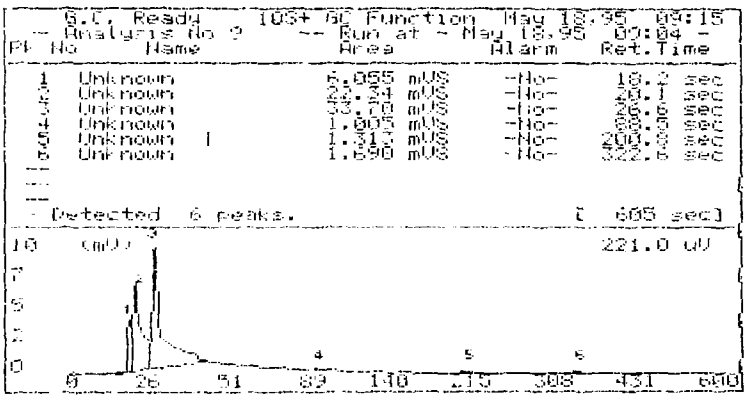
500 ug/l
50 ul



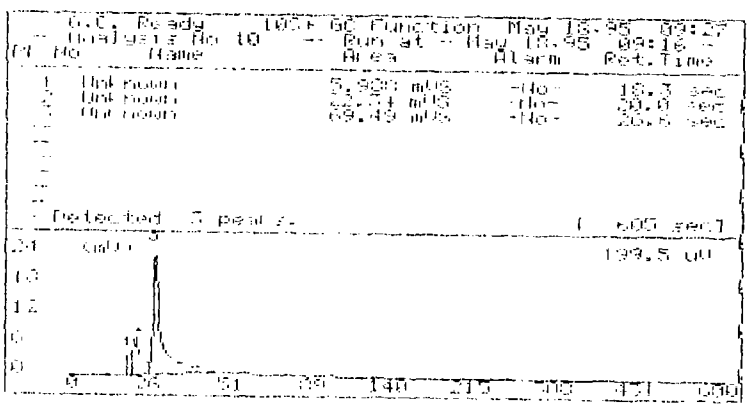
MW26-95-2
100 ul



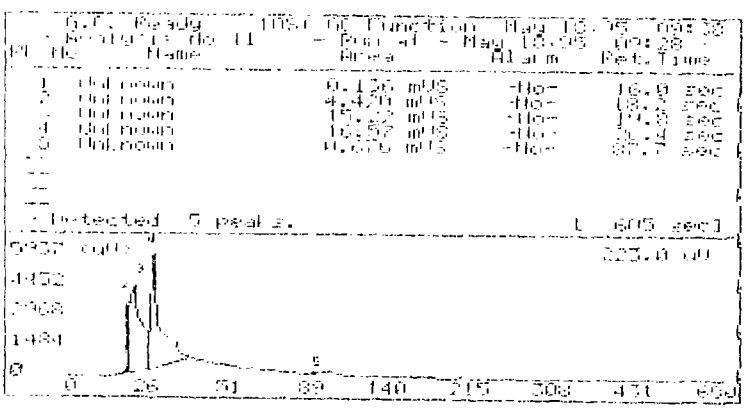
MW26-95-2*



MW26-95-2*



MW15-19-2

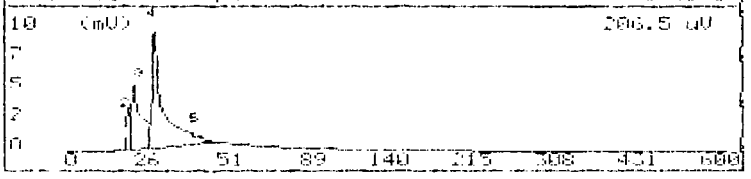


MW23-95-2

G.C. Ready 105+ GC Function May 18,95 09:52
-- Analysis No 12 -- Run at - May 18,95 09:41 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.109 mUS	-No-	16.2 sec
2	Unknown	4.729 mUS	-No-	18.3 sec
3	Unknown	18.01 mUS	-No-	20.1 sec
4	Unknown	36.48 mUS	-No-	35.2 sec
5	Unknown	0.226 mUS	-No-	40.2 sec

- Detected 5 peaks. [605 sec]

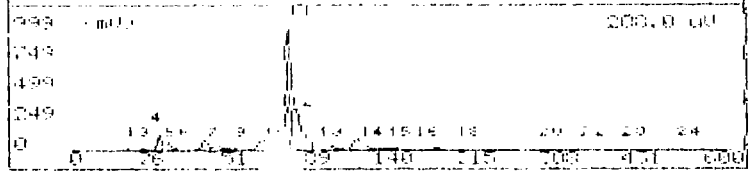


MW25-95-2
100 uL

G.C. Ready 105+ GC Function May 18,95 10:04
-- Analysis No 13 -- Run at - May 18,95 09:55 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	17.72 mUS	-No-	16.7 sec
2	Unknown	77.18 mUS	-No-	18.9 sec
3	Unknown	97.84 mUS	-No-	21.4 sec
4	Unknown	215.4 mUS	-No-	29.8 sec
5	Unknown	724.3 mUS	-No-	34.4 sec
6	Unknown	324.3 mUS	-No-	40.2 sec
7	Unknown	161.2 mUS	-No-	44.0 sec
8	Unknown	120.2 mUS	-No-	49.1 sec

- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 105+ GC Function May 18,95 10:05
-- Analysis No 17 -- Run at - May 18,95 09:55 -

Pk No	Name	Area	Alarm	Ret.Time
10	Unknown	260.7 mUS	-No-	58.0 sec
11	Unknown	0.033 USec	-No-	92.0 sec
12	Unknown	0.029 USec	-No-	93.0 sec
13	Unknown	782.4 mUS	-No-	98.5 sec
14	Unknown	1.159 USec	-No-	111.5 sec
15	Unknown	19.59 mUS	-No-	145.0 sec
16	Unknown	291.2 mUS	-No-	150.2 sec
17	Unknown	791.1 mUS	-No-	168.6 sec
18	Unknown	144.9 mUS	-No-	192.4 sec

- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]

B
TCE

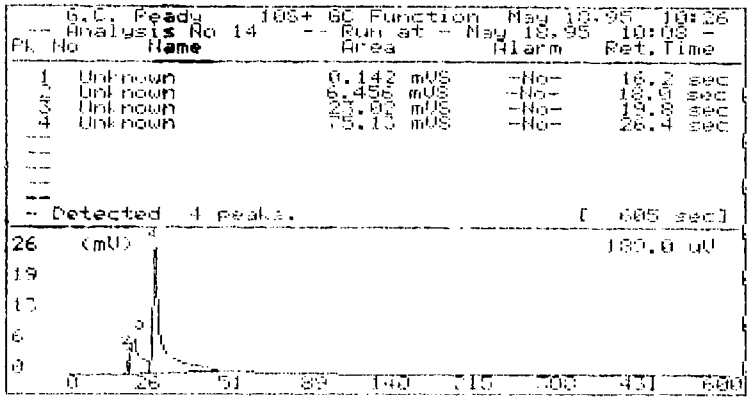
G.C. Ready 105+ GC Function May 18,95 10:05
-- Analysis No 13 -- Run at - May 18,95 09:54 -

Pk No	Name	Area	Alarm	Ret.Time
16	Unknown	2.722 mUS	-No-	150.2 sec
17	Unknown	791.1 mUS	-No-	168.6 sec
18	Unknown	144.9 mUS	-No-	192.4 sec
19	Unknown	18.48 mUS	-No-	205.0 sec
20	Unknown	260.7 mUS	-No-	266.1 sec
21	Unknown	5.775 mUS	-No-	288.4 sec
22	Unknown	409.8 mUS	-No-	320.2 sec
23	Unknown	18.48 mUS	-No-	424.0 sec
24	Unknown	12.65 mUS	-No-	474.2 sec

- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]

Yuck

MW27-95-2


G.C. Ready 105+ GC Function May 18.95 10:26
-- Analysis No 14 -- Run at - May 18.95 10:08 -
Pk No Name Area Alarm Ret. Time
1 Unknown 0.142 mVS -No- 16.2 sec
2 Unknown 0.456 mVS -No- 18.0 sec
3 Unknown 43.05 mVS -No- 19.8 sec
4 Unknown 75.13 mVS -No- 26.4 sec
- Detected 4 peaks. [005 sec]
26 (mV)
19
13
6
0
180.0 uV
0 25 51 80 140 215 305 431 600

GC Data (5/18/95)

SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
MW25-95-2	1249.0	257.9	0.0	0.0	67.1	152.1	0.0	1726.1

5/19/95

Machine Blank.

```
G.C. Ready    10SI GC Function  May 19,95  07:32
-- Analysis No 1    -- Run at - May 19,95  07:17 -
Pk No    Name          Area          Alarm    Ret.Time
  1   Unknown      1.322 mUS      -No-      27.0 sec
  2   Unknown      0.623 mUS      -No-      92.5 sec
  3   Unknown      0.847 mUS      -No-      99.0 sec
 ---
 ---
 ---
 ---
 ---
- Detected  3 peaks.                [  605 sec]
1037 (uV)                                165.5 uV
777                    29
518          1
259
0
   0    26    51    89    140   215   308   431   600
```

Syringe Blank A

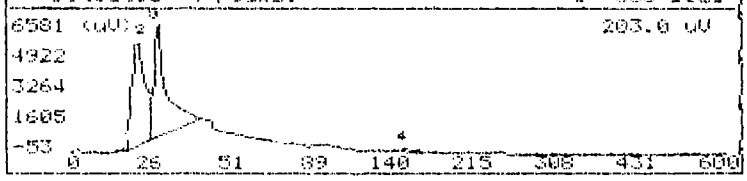
```
G.C. Ready    10SI GC Function  May 19,95  07:44
-- Analysis No 2    -- Run at - May 19,95  07:33 -
Pk No    Name          Area          Alarm    Ret.Time
  1   Unknown      0.186 mUS      -No-      16.0 sec
  2   Unknown      33.54 mUS      -No-      19.8 sec
 ---
 ---
 ---
 ---
 ---
- Detected  2 peaks.                [  605 sec]
2934 (uV)                                212.0 uV
2154
1374
594
-185
   0    26    51    89    140   215   308   431   600
```

Syringe Blank B

```
G.C. Ready    10SI GC Function  May 19,95  07:56
-- Analysis No 3    -- Run at - May 19,95  07:45 -
Pk No    Name          Area          Alarm    Ret.Time
  1   Unknown      0.140 mUS      -No-      16.2 sec
  2   Unknown      31.88 mUS      -No-      20.0 sec
  3   Unknown      24.50 mUS      -No-      26.7 sec
 ---
 ---
 ---
 ---
 ---
- Detected  3 peaks.                [  605 sec]
3359 (uV)                                186.0 uV
2475
1591
707
-176
   0    26    51    89    140   215   308   431   600
```

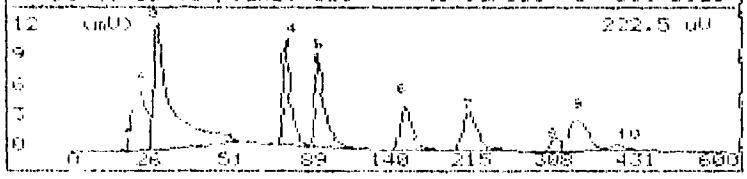
Method Blank 250 A

```
  G.C. Ready     105+ GC Function  May 19,95  08:06
 -- Analysis No 4      -- Run at - May 19,95  07:55 -
Pk No      Name          Area          Alarm    Ret.Time
  1    Unknown          0.119 mUS     -No-       16.1 sec
  2    Unknown          25.87 mUS     -No-       20.6 sec
  3    Unknown          24.72 mUS     -No-       27.0 sec
  4    Unknown          1.267 mUS     -No-      143.2 sec
 - Detected  4 peaks.                        [  605 sec]
```



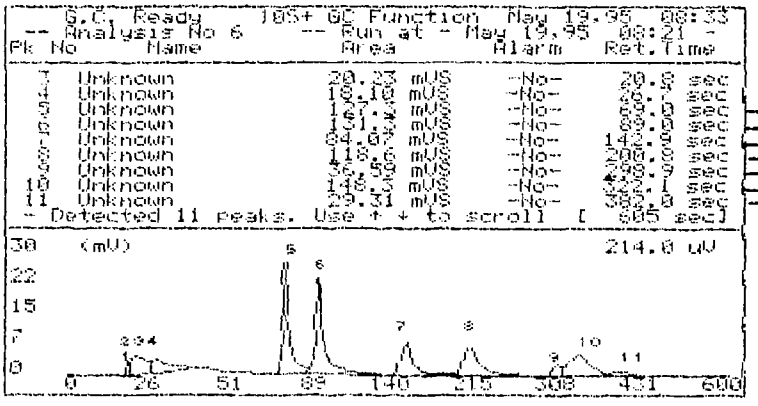
10 ug/l Std 250 ul

```
  G.C. Ready     105+ GC Function  May 19,95  08:19
 -- Analysis No 5      -- Run at - May 19,95  08:09 -
Pk No      Name          Area          Alarm    Ret.Time
  1    Unknown          0.035 mUS     -No-       16.9 sec
  2    Unknown          [illegible]   -No-       [illegible] sec
  3    Unknown          [illegible]   -No-       [illegible] sec
  4    Unknown          [illegible]   -No-       [illegible] sec
  5    Unknown          61.1[illegible] -No-     [illegible] sec
  6    Unknown          [illegible]   -No-       [illegible] sec
  7    Unknown          586.6[illegible] -No-    [illegible] sec
  8    Unknown          56.54 mUS     -No-       [illegible] sec
  9    Unknown          19.24 mUS     -No-       [illegible] sec
 10    Unknown          87.17 mUS     -No-       [illegible] sec
 - Detected 10 peaks. Use 1 ↓ to scroll  [  605 sec]
```

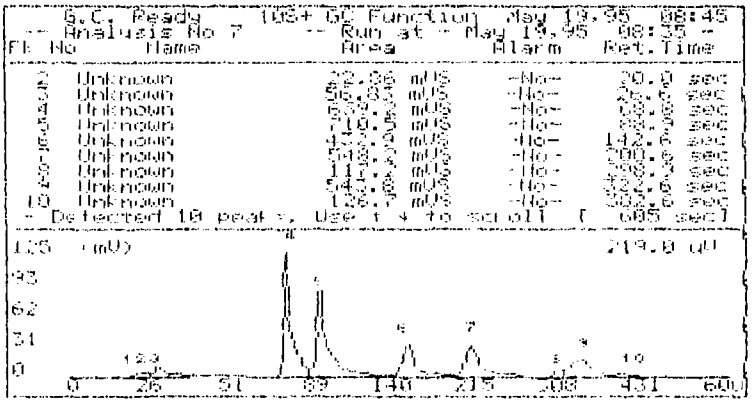



```
  G.C. Ready     105+ GC Function  May 19,95  08:20
 -- Analysis No 5      -- Run at - May 19,95  08:09 -
Pk No      Name          Area          Alarm    Ret.Time
  2    Unknown          [illegible]   -No-       20.1 sec
  3    Unknown          [illegible]   -No-       [illegible] sec
  4    Unknown          [illegible]   -No-       [illegible] sec
  5    Unknown          [illegible]   -No-       [illegible] sec
  6    Unknown          [illegible]   -No-       [illegible] sec
  7    Unknown          [illegible]   -No-       [illegible] sec
  8    Unknown          [illegible]   -No-       [illegible] sec
  9    Unknown          [illegible]   -No-       [illegible] sec
 10    Unknown          17.07 mUS     -No-       [illegible] sec
 - Detected 10 peaks. Use 1 ↓ to scroll  [  605 sec]
```

50 ug/l
100 ul



50 ug/l
50 ul



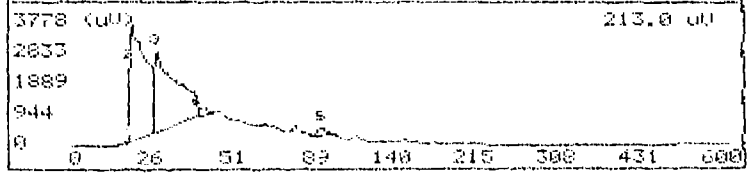
***8>B^x

SB7-1-1.5
100 ul.
13.9g

G.C. Ready 100+ GC Function May 19,95 10:32
--- Analysis No 9 --- Run at - May 19,95 10:21 ---

Pk No	Name	Area	Alarm	Ret. Time
1	Unknown	9.026 mVS	-No-	16.2 sec
2	Unknown	16.35 mVS	-No-	19.4 sec
3	Unknown	17.00 mVS	-No-	35.6 sec
4	Unknown	0.4390 mVS	-No-	40.4 sec
5	Unknown	1.395 mVS	-No-	89.3 sec

- Detected 5 peaks. [605 sec]



SBT-1-3.5

100 ul

9.0g

G.C. Ready 105# GC Function May 19,95 10:45
-- Analysis No 9 --- Run at - May 19,95 10:33 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	17.25	mUS	-No-	18.3	sec
2	Unknown	624.2	mUS	-No-	26.7	sec
3	Unknown	668.5	mUS	-No-	34.4	sec
4	Unknown	1165.5	mUS	-No-	44.1	sec
5	Unknown	1044.5	mUS	-No-	444.6	sec
6	Unknown	1001.0	mUS	-No-	449.4	sec
7	Unknown	1038.1	mUS	-No-	458.4	sec
8	Unknown	1244.1	mUS	-No-	734	sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]



B

G.C. Ready 105# GC Function May 19,95 10:46
-- Analysis No 9 --- Run at - May 19,95 10:33 -

Pk No	Name	Area		Alarm	Ret.Time	
10	Unknown	398.5	mUS	-No-	89.0	sec
11	Unknown	198.2	mUS	-No-	97.4	sec
12	Unknown	1.159	USec	-No-	111.8	sec
13	Unknown	44.81	mUS	-No-	135.3	sec
14	Unknown	272.9	mUS	-No-	162.0	sec
15	Unknown	398.5	mUS	-No-	194.8	sec
16	Unknown	398.1	mUS	-No-	206.0	sec
17	Unknown	465.7	mUS	-No-	266.1	sec
18	Unknown	127.0	mUS	-No-	298.9	sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]

TCC

E

G.C. Ready 105# GC Function May 19,95 10:46
-- Analysis No 9 --- Run at - May 19,95 10:33 -

Pk No	Name	Area		Alarm	Ret.Time	
13	Unknown	44.81	mUS	-No-	135.3	sec
14	Unknown	272.9	mUS	-No-	162.0	sec
15	Unknown	398.5	mUS	-No-	194.8	sec
16	Unknown	398.1	mUS	-No-	206.0	sec
17	Unknown	465.7	mUS	-No-	266.1	sec
18	Unknown	127.0	mUS	-No-	298.9	sec
19	Unknown	78.06	mUS	-No-	322.1	sec
20	Unknown	24.81	mUS	-No-	372.0	sec
21	Unknown	72.09	mUS	-No-	423.7	sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]

Y M.P

(55.

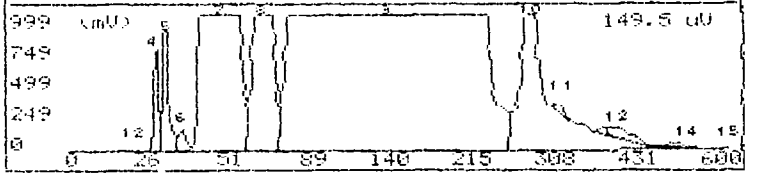
(? .11.

SBT-7-5.5
100 ml
11.5g

G.C. Ready 105+ GC Function May 13,95 11:00
-- Analysis No 10 -- Run at - May 13,95 10:48 -

PK No	Name	Area		Alarm	Ret.Time	
1	Unknown	3.773	mVS	-No-	18.4	sec
2	Unknown	5.242	mVS	-No-	20.1	sec
3	Unknown	3.117	mVS	-No-	21.6	sec
4	Unknown	1.541	USec	-No-	27.4	sec
5	Unknown	2.612	USec	-No-	29.7	sec
6	Unknown	4.901	mVS	-No-	34.1	sec
7	Unknown	16.43	USec	-No-	46.7	sec
8	Unknown	23.74	USec	-No-	60.1	sec
9	Unknown	1998.	USec	-No-	1[illegible].8	sec

- Detected 15 peaks. Use + + to scroll [605 sec]



G.C. Ready 105+ GC Function May 13,95 11:01
-- Analysis No 10 -- Run at - May 13,95 10:48 -

PK No	Name	Area		Alarm	Ret.Time	
7	Unknown	16.43	USec	-No-	46.7	sec
8	Unknown	23.74	USec	-No-	60.1	sec
9	Unknown	1998.	USec	-No-	1[illegible].8	sec
10	Unknown	51.20	USec	-No-	[illegible]	sec
11	Unknown	4[illegible]8.5	mVS	-No-	[illegible]	sec
12	Unknown	375.0	mVS	-No-	[illegible]	sec
13	Unknown	2.210	USec	-No-	[illegible]	sec
14	Unknown	1.426	USec	-No-	480.0	sec
15	Unknown	103.9	mVS	-No-	565.6	sec

- Detected 15 peaks. Use + + to scroll [605 sec]

SB7-1-5.5

25 ml

11.5

g

G.C. Ready 10S+ GC Function May 19,95 11:23
-- Analysis No 12 -- Run at - May 19,95 11:11 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	0.099	mUS	-No-	16.	sec
2	Unknown	2.102	mUS	-No-	19.	sec
3	Unknown	4.744	mUS	-No-	21.	sec
4	Unknown	112.7	mUS	-No-	36.	sec
5	Unknown	28.77	mUS	-No-	40.	sec
6	Unknown	44.40	mUS	-No-	44.	sec
7	Unknown	451.0	mUS	-No-	41.	sec
8	Unknown	608.2	mUS	-No-	44.	sec
9	Unknown	1.496	USec	-No-	49.	sec

- Detected 22 peaks. Use + - to scroll [605 sec]



G.C. Ready 10S+ GC Function May 19,95 11:24
-- Analysis No 12 -- Run at - May 19,95 11:11 -

Pk No	Name	Area		Alarm	Ret.Time	
10	Unknown	1.910	USec	-No-	59.3	sec
11	Unknown	1.245	USec	-No-	64.1	sec
12	Unknown	1.158	USec	-No-	74.6	sec
13	Unknown	1.578	USec	-No-	82.9	sec
14	Unknown	4.743	USec	-No-	89.6	sec
15	Unknown	3.511	USec	-No-	98.1	sec
16	Unknown	14.44	USec	-No-	112.9	sec
17	Unknown	8.525	USec	-No-	170.8	sec
18	Unknown	6.905	USec	-No-	208.6	sec

- Detected 22 peaks. Use + - to scroll [605 sec]

680 (mV) 164.5 uV

TCE

G.C. Ready 10S+ GC Function May 19,95 11:24
-- Analysis No 12 -- Run at - May 19,95 11:11 -

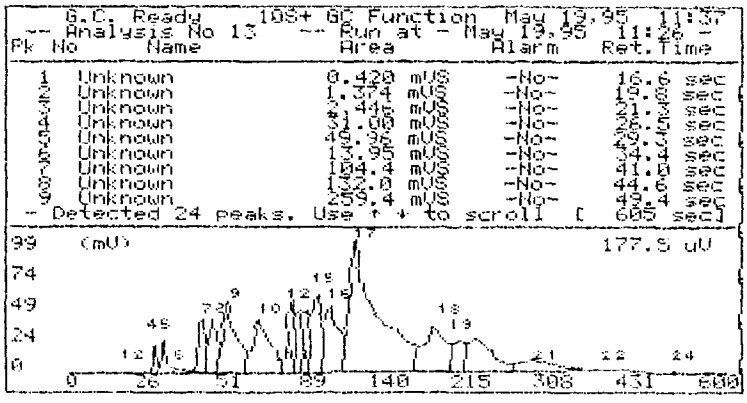
Pk No	Name	Area		Alarm	Ret.Time	
14	Unknown	4.743	USec	-No-	89.6	sec
15	Unknown	3.511	USec	-No-	98.1	sec
16	Unknown	14.44	USec	-No-	112.9	sec
17	Unknown	8.525	USec	-No-	170.8	sec
18	Unknown	6.905	USec	-No-	208.6	sec
19	Unknown	9.509	mUS	-No-	254.4	sec
20	Unknown	4.442	USec	-No-	277.6	sec
21	Unknown	1.045	USec	-No-	316.0	sec
22	Unknown	344.2	mUS	-No-	481.2	sec

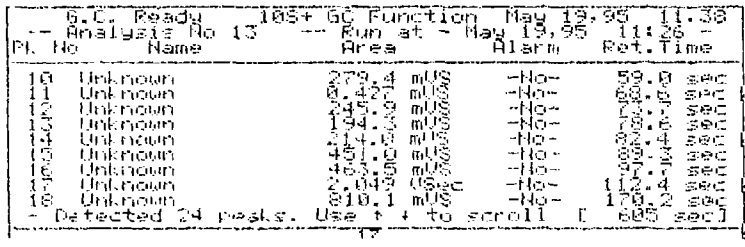
- Detected 22 peaks. Use + - to scroll [605 sec]

SB7-1-7.5

10 ul

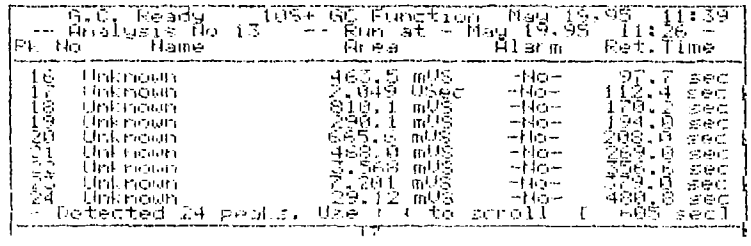
10.5





B

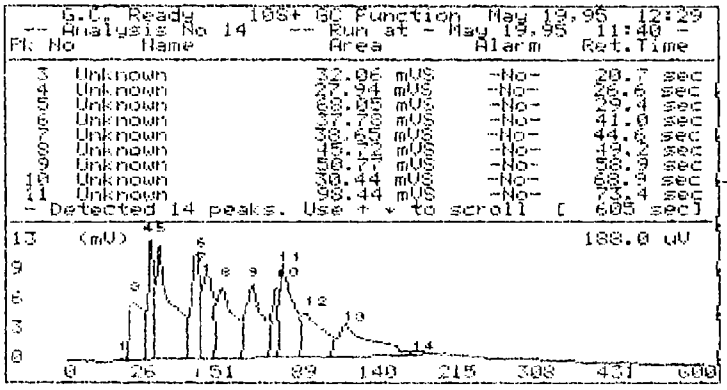
TCE



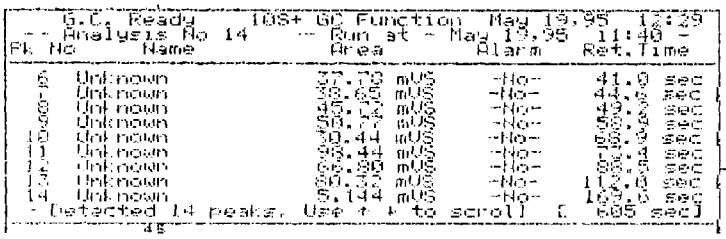
SB7-2-1.5

13.9g

100 ul



B



TOP

587.2 - 3.5

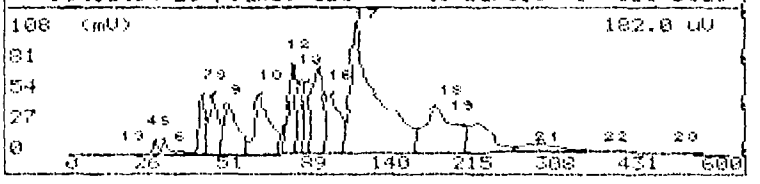
10 µl

10.4 g

G.C. Ready 105+ GC Function May 19,95 12:52
-- Analysis No 15 -- Run at - May 19,95 12:40 -

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	0.390	mUS	-No-	16.1 sec
2	Unknown	1.364	mUS	-No-	18.5 sec
3	Unknown	1.780	mUS	-No-	21.1 sec
4	Unknown	10.965	mUS	-No-	35.6 sec
5	Unknown	4.965	mUS	-No-	43.4 sec
6	Unknown	10.011	mUS	-No-	44.4 sec
7	Unknown	1.226	mUS	-No-	41.2 sec
8	Unknown	1.242	mUS	-No-	44.3 sec
9	Unknown	204.4	mUS	-No-	49.4 sec

- Detected 23 peaks. Use ↑ ↓ to scroll [605 sec]



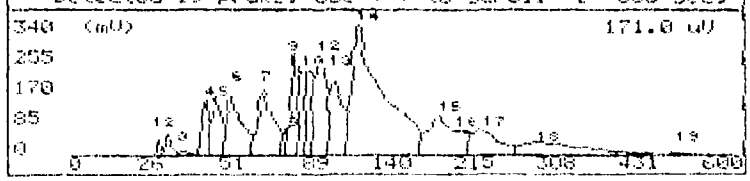
@@@

SB7-2-5.5
10 ml
9.2g

G.C. Ready 105+ GC Function May 19,95 13:10
-- Analysis No 16 -- Run at - May 19,95 12:56 -

Pk No	Name	Area		Alarm	Ret.Time	
2	Unknown	129.3	mUS	-No-	29.4	sec
3	Unknown	331.8	mUS	-No-	34.4	sec
4	Unknown	581.2	mUS	-No-	41.4	sec
5	Unknown	509.5	mUS	-No-	44.0	sec
6	Unknown	616.5	mUS	-No-	45.6	sec
7	Unknown	1.051	USec	-No-	50.1	sec
8	Unknown	236.9	mUS	-No-	55.0	sec
9	Unknown	1.287	USec	-No-	74.5	sec
10	Unknown	929.1	mUS	-No-	76.6	sec

- Detected 19 peaks. Use + + to scroll [605 sec]

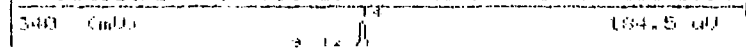


B

G.C. Ready 105+ GC Function May 19,95 13:12
-- Analysis No 16 -- Run at - May 19,95 12:50 -

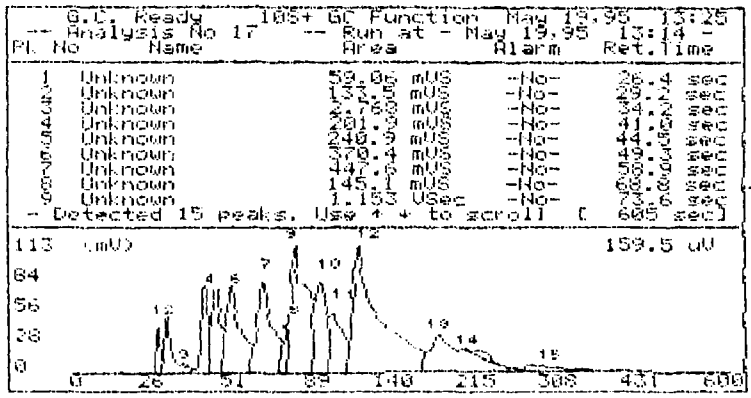
Pk No	Name	Area		Alarm	Ret.Time	
11	Unknown	906.8	mUS	-No-	82.5	sec
12	Unknown	2.033	USec	-No-	89.6	sec
13	Unknown	1.342	USec	-No-	98.0	sec
14	Unknown	2.624	USec	-No-	112.9	sec
15	Unknown	2.056	USec	-No-	120.4	sec
16	Unknown	4.545	mUS	-No-	134.4	sec
17	Unknown	1.978	USec	-No-	138.1	sec
18	Unknown	1.285	USec	-No-	170.6	sec
19	Unknown	178.5	mUS	-No-	179.6	sec

- Detected 19 peaks. Use + + to scroll [605 sec]

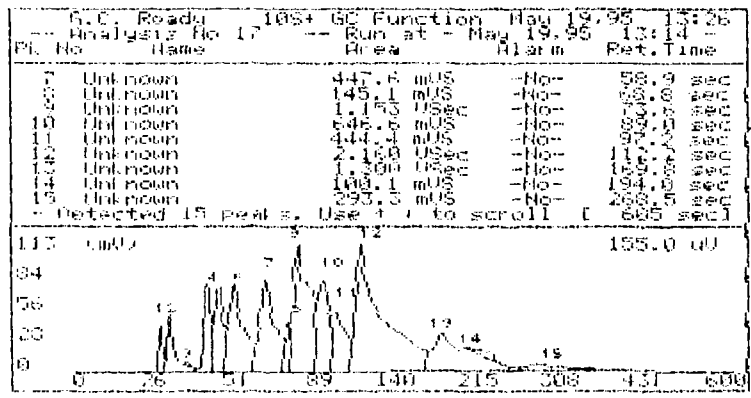


TCE

SB7-2-7.5
10 ul
11.5 g

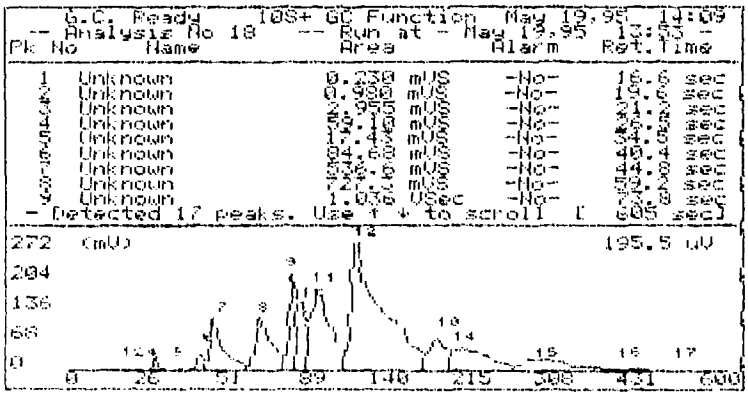


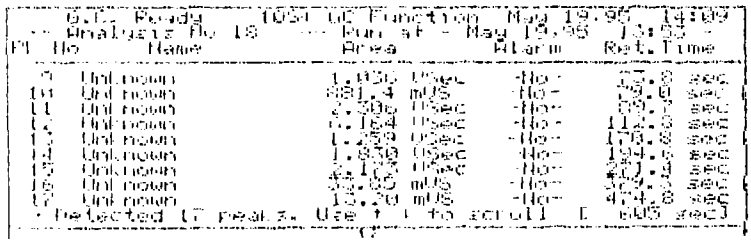
B



TCE

SB7-3-7.5
10ml
10.6g





TCE

SBT-3-55
10 ml
9.2g

G.C. Ready 105+ GC Function May 19,95 14:27
-- Analysis No 19 -- Run at - May 19,95 14:11 -

Pk No	Name	Area	Alarm	Ret.Time
2	Unknown	2.364 mUS	-No-	21.1 sec
3	Unknown	24.44 mUS	-No-	26.2 sec
4	Unknown	69.99 mUS	-No-	34.3 sec
5	Unknown	24.56 mUS	-No-	40.1 sec
6	Unknown	215.1 mUS	-No-	44.7 sec
7	Unknown	408.6 mUS	-No-	52.1 sec
8	Unknown	431.2 mUS	-No-	70.6 sec
10	Unknown	1.144 USec	-No-	89.8 sec

- Detected 14 peaks. Use + + to scroll [605 sec]

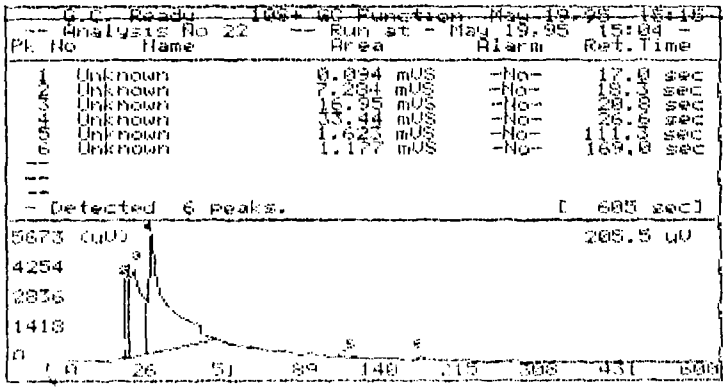


G.C. Ready 105+ GC Function May 19,95 14:28
-- Analysis No 19 -- Run at - May 19,95 14:11 -

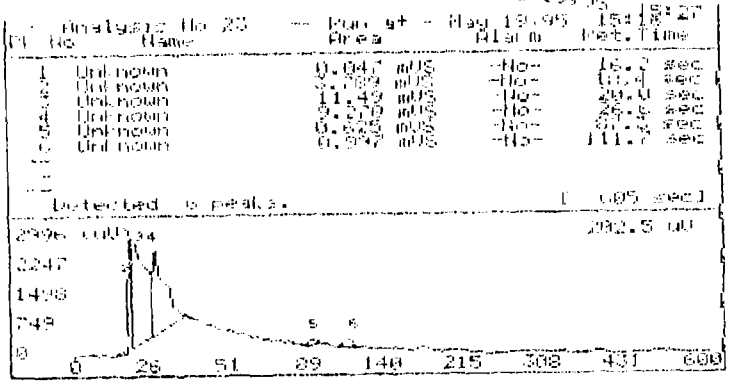
Pk No	Name	Area	Alarm	Ret.Time	
6	Unknown	218.1 mUS	-No-	44.7 sec	
7	Unknown	408.6 mUS	-No-	52.1 sec	
8	Unknown	431.2 mUS	-No-	70.6 sec	
10	Unknown	1.144 USec	-No-	89.8 sec	← TCE
11	Unknown	1.554 USec	-No-	113.4 sec	
12	Unknown	1.673 USec	-No-	141.2 sec	
13	Unknown	124.2 mUS	-No-	194.0 sec	
14	Unknown	526.7 mUS	-No-	201.0 sec	

- Detected 14 peaks. Use + + to scroll [605 sec]

SB7-4-3.5
100 ul
13.8g



SB7-4-3.5
100 ul
9.0g

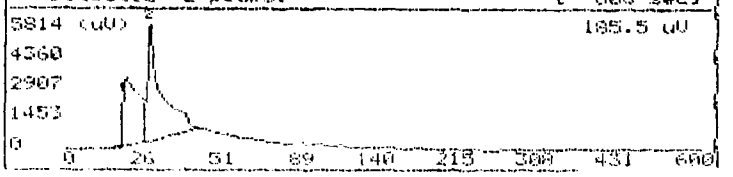


SB7-4-5.5
100 ul

G.C. Ready 100+ GC Function May 12,95 15:39
-- Analysis No 24 -- Run at - May 19,95 15:28 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	17.57 mUS	-No-	18.4 sec
2	Unknown	26.08 mUS	-No-	26.6 sec

- Detected 2 peaks. [600 sec]

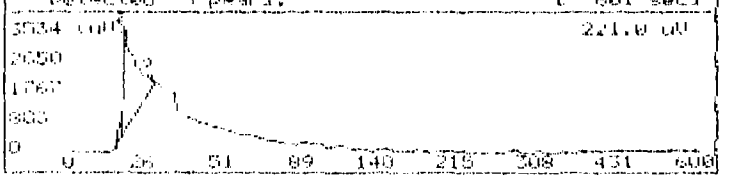


SB7-4-7.5
150 ul

G.C. Ready 100+ GC Function May 19,95 15:50
-- Analysis No 25 -- Run at - May 19,95 15:40 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.567 mUS	-No-	17.0 sec
2	Unknown	11.98 mUS	-No-	18.6 sec
3	Unknown	0.218 mUS	-No-	26.8 sec

- Detected 3 peaks. [601 sec]



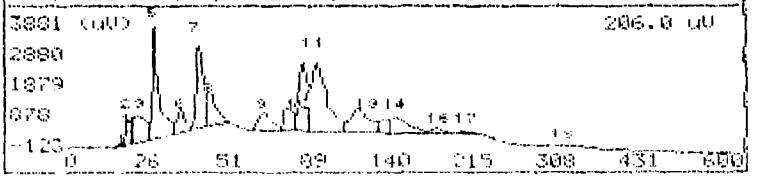
@@@

SB7-3-1.5
10 µl
11.4g

G.C. Ready 105+ GC Function May 19,95 15:00
-- Analysis No 21 -- Run at - May 19,95 14:49 -

Pk No	Name	Area		Alarm	Ret.Time
1	Unknown	0.480	mUS	-No-	16.6 sec
2	Unknown	1.255	mUS	-No-	102.5 sec
3	Unknown	0.647	mUS	-No-	134.7 sec
4	Unknown	4.107	mUS	-No-	230.0 sec
5	Unknown	6.581	mUS	-No-	305.4 sec
6	Unknown	1.960	mUS	-No-	342.4 sec
7	Unknown	5.956	mUS	-No-	440.2 sec
8	Unknown	2.855	mUS	-No-	464.5 sec
9	Unknown	2.489	mUS	-No-	559.0 sec

- Detected 18 peaks. Use ↑ + to scroll [605 secl



G.C. Ready 105+ GC Function May 19,95 15:01
-- Analysis No 21 -- Run at - May 19,95 14:49 -

Pk No	Name	Area		Alarm	Ret.Time	
10	Unknown	4.654	mUS	-No-	60.0 sec	B
11	Unknown	13.084	mUS	-No-	88.4 sec	
12	Unknown	64.380	mUS	-No-	98.0 sec	TCE
13	Unknown	2.099	mUS	-No-	116.6 sec	
14	Unknown	1.462	mUS	-No-	150.0 sec	
15	Unknown	0.265	mUS	-No-	196.5 sec	
16	Unknown	1.211	mUS	-No-	250.2 sec	
17	Unknown	1.026	mUS	-No-	290.2 sec	
18	Unknown	0.514	mUS	-No-	298.4 sec	E

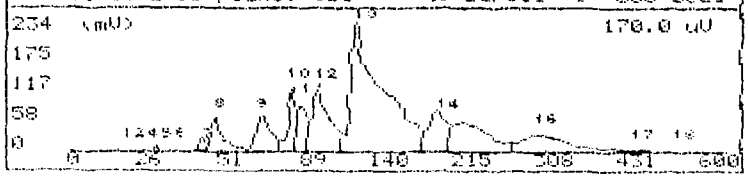
- Detected 18 peaks. Use ↑ + to scroll [605 secl

SB7-3-3.5
10 µl
9.7g

G.C. Ready 10S+ GC Function May 19,95 14:43
-- Analysis No 20 -- Run at - May 19,95 14:20 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.518 mUS	-No-	16.7 sec
2	Unknown	1.479 mUS	-No-	19.0 sec
3	Unknown	2.616 mUS	-No-	21.6 sec
4	Unknown	17.05 mUS	-No-	25.5 sec
5	Unknown	3.844 mUS	-No-	33.4 sec
6	Unknown	0.4437 mUS	-No-	34.0 sec
7	Unknown	500.02 mUS	-No-	40.0 sec
8	Unknown	4305.7 mUS	-No-	44.0 sec
9	Unknown	3385.5 mUS	-No-	59.2 sec

- Detected 10 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 10S+ GC Function May 19,95 14:44
-- Analysis No 20 -- Run at - May 19,95 14:20 -

Pk No	Name	Area	Alarm	Ret.Time
10	Unknown	625.2 mUS	-No-	73.8 sec
11	Unknown	510.8 mUS	-No-	89.4 sec
12	Unknown	5.421 USec	-No-	89.4 sec
13	Unknown	5.486 USec	-No-	112.8 sec
14	Unknown	1.468 USec	-No-	170.8 sec
15	Unknown	2.117 USec	-No-	194.2 sec
16	Unknown	2.324 USec	-No-	271.2 sec
17	Unknown	15.76 mUS	-No-	405.3 sec
18	Unknown	14.29 mUS	-No-	472.8 sec

- Detected 10 peaks. Use ↑ ↓ to scroll [605 sec]

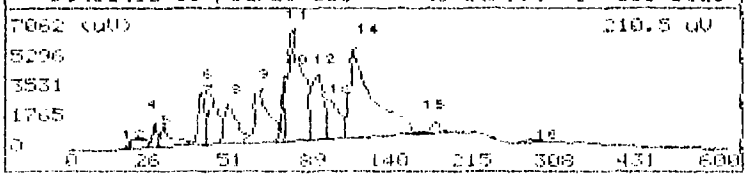
—TCC

SB7-1-3.5
Duplicate
10 ul
9.8g

G.C. Ready 105+ GC Function May 19,95 16:04
-- Analysis No 26 -- Run at - May 19,95 15:51 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.045 mUS	-No-	16.6 sec
2	Unknown	0.825 mUS	-No-	19.6 sec
3	Unknown	2.322 mUS	-No-	21.4 sec
4	Unknown	2.265 mUS	-No-	26.4 sec
5	Unknown	4.409 mUS	-No-	29.1 sec
6	Unknown	2.520 mUS	-No-	40.8 sec
7	Unknown	3.645 mUS	-No-	44.4 sec
8	Unknown	9.129 mUS	-No-	49.1 sec
9	Unknown	15.85 mUS	-No-	58.8 sec

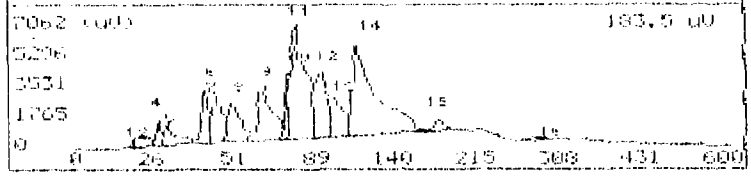
- Detected 16 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 105+ GC Function May 19,95 16:04
-- Analysis No 26 -- Run at - May 19,95 15:51 -

Pk No	Name	Area	Alarm	Ret.Time	
8	Unknown	9.129 mUS	-No-	49.1 sec	
9	Unknown	15.85 mUS	-No-	58.8 sec	
10	Unknown	11.92 mUS	-No-	70.8 sec	— B
11	Unknown	58.69 mUS	-No-	73.4 sec	
12	Unknown	20.74 mUS	-No-	88.6 sec	— T.C.E.
13	Unknown	1.443 mUS	-No-	97.0 sec	
14	Unknown	82.16 mUs	-No-	112.1 sec	
15	Unknown	6.758 mUS	-No-	169.6 sec	
16	Unknown	2.625 mUS	-No-	269.8 sec	

- Detected 16 peaks. Use ↑ ↓ to scroll [605 sec]

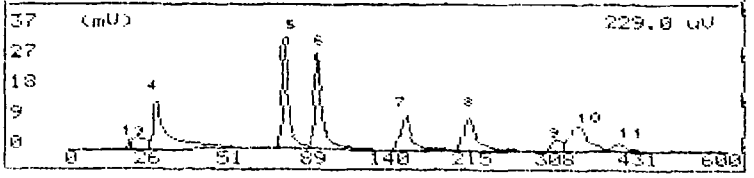


50 ug/l
100 ul

G.C. Ready 10S+ GC Function May 19,95 16:16
-- Analysis No 27 -- Run at - May 19,95 16:06 -

Pk No	Name	Area	Alarm	Ret.Time
3	Unknown	18.21 mUS	-No-	21.0 sec
4	Unknown	69.94 mUS	-No-	26.8 sec
5	Unknown	151.4 mUS	-No-	69.0 sec
6	Unknown	155.3 mUS	-No-	89.5 sec
7	Unknown	102.1 mUS	-No-	143.0 sec
8	Unknown	142.9 mUS	-No-	201.0 sec
9	Unknown	53.07 mUS	-No-	298.6 sec
10	Unknown	187.5 mUS	-No-	321.6 sec
11	Unknown	45.40 mUS	-No-	351.3 sec

- Detected 11 peaks. Use ↑ ↓ to scroll [605 sec]

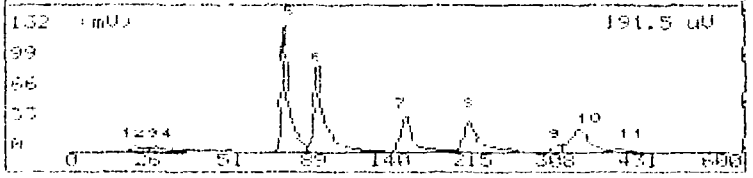


500 ug/l
50 ul

G.C. Ready 10S+ GC Function May 19,95 16:39
-- Analysis No 28 -- Run at - May 19,95 16:17 -

Pk No	Name	Area	Alarm	Ret.Time
3	Unknown	42.28 mUS	-No-	26.4 sec
4	Unknown	0.346 mUS	-No-	31.4 sec
5	Unknown	644.9 mUS	-No-	69.6 sec
6	Unknown	710.9 mUS	-No-	89.5 sec
7	Unknown	445.0 mUS	-No-	143.0 sec
8	Unknown	579.5 mUS	-No-	201.0 sec
9	Unknown	199.5 mUS	-No-	298.7 sec
10	Unknown	694.8 mUS	-No-	322.1 sec
11	Unknown	138.6 mUS	-No-	352.3 sec

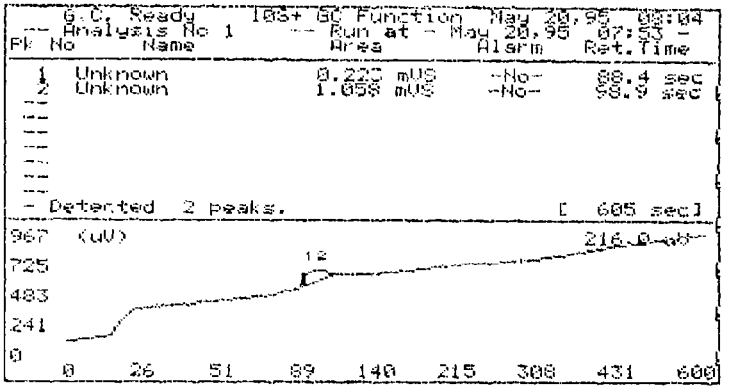
- Detected 11 peaks. Use ↑ ↓ to scroll [605 sec]

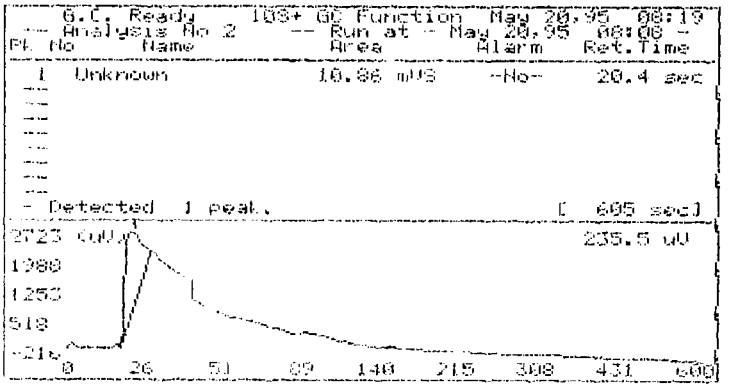


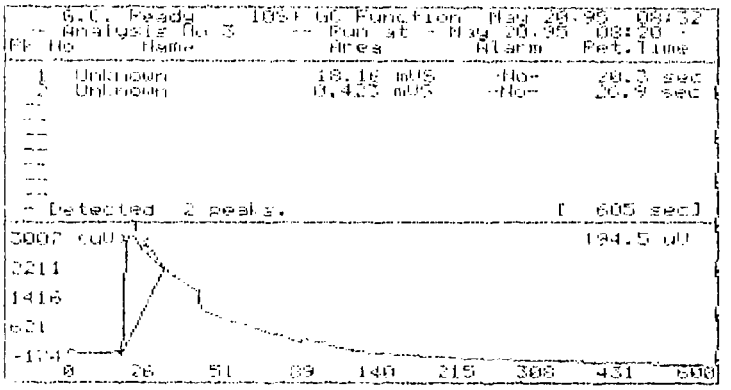
GC Data (5/19/95)

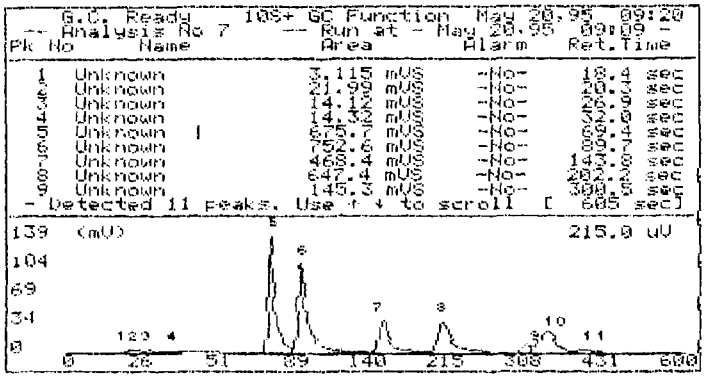
SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
SB7-1-1.5	15.7	335.4	0.0	0.0	0.0	0.0	0.0	351.1
SB7-1-3.5	174.4	219.7	0.0	0.0	289.1	47.4	0.0	730.5
SB7-1-3.5 D	87.3	218.9	0.0	0.0	0.0	0.0	0.0	306.2
SB7-1-5.5	0.0	7143.4	0.0	0.0	0.0	0.0	0.0	7143.4
SB7-1-7.5	2.9	2997.4	0.0	0.0	0.0	0.0	0.0	3000.3
SB7-2-3.5	573.9	3711.3	0.0	0.0	0.0	0.0	0.0	4285.2
SB7-2-5.5	1847.9	15466.2	0.0	0.0	0.0	0.0	0.0	17314.1
SB7-2-7.5	905.4	3923.7	0.0	0.0	0.0	0.0	0.0	4829.1
SB7-3-1.5	29.3	137.0	0.0	0.0	10.1	0.0	0.0	176.4
SB7-3-3.5	0.0	10222.9	0.0	0.0	0.0	0.0	0.0	10222.9
SB7-3-5.5	0.0	25592.4	0.0	0.0	0.0	0.0	0.0	25592.4
SB7-3-7.5	0.0	15181.2	0.0	0.0	0.0	0.0	0.0	15181.2

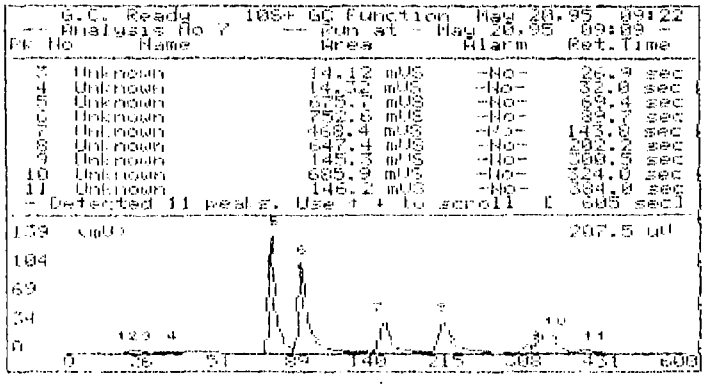
5/20/95


G.C. Ready 103+ GC Function May 20,95 08:04
-- Analysis No 1 -- Run at - May 20,95 07:53 -
Pk No Name Area Alarm Ret.Time
1 Unknown 0.22C mUS -No- 68.4 sec
2 Unknown 1.05S mUS -No- 98.9 sec
- Detected 2 peaks. [605 sec]
967 (uV)
725
483
241
0
216.0 uV
1
2
0 26 51 89 140 215 308 431 600


G.C. Ready 103+ GC Function May 20,95 08:19
-- Analysis No 2 -- Run at - May 20,95 08:08 -
Pk No Name Area Alarm Ret.Time
1 Unknown 10.86 mUS -No- 20.4 sec
- Detected 1 peak. [605 sec]
2723 (uV)
1980
1253
518
-216
235.5 uV
0 26 51 89 140 215 308 431 600


G.C. Ready 103+ GC Function May 20,95 08:32
-- Analysis No 3 -- Run at - May 20,95 08:20 -
Pk No Name Area Alarm Ret.Time
1 Unknown 18.1C mUS -No- 49.3 sec
2 Unknown 0.42S mUS -No- 56.9 sec
- Detected 2 peaks. [605 sec]
3007 (uV)
2211
1416
621
-174
194.5 uV
0 26 51 89 140 215 308 431 600


G.C. Ready 10S+ GC Function May 20,95 09:20
-- Analysis No 7 -- Run at - May 20,95 09:09 -
Pk No Name Area Alarm Ret.Time
1 Unknown 3.115 mUS -No- 18.4 sec
2 Unknown 21.99 mUS -No- 20.4 sec
3 Unknown 14.12 mUS -No- 26.9 sec
4 Unknown 14.32 mUS -No- 32.0 sec
5 Unknown 695.1 mUS -No- 69.4 sec
6 Unknown 752.6 mUS -No- 89.4 sec
7 Unknown 468.4 mUS -No- 143.0 sec
8 Unknown 647.4 mUS -No- 202.5 sec
9 Unknown 145.3 mUS -No- 300.5 sec
- Detected 11 peaks. Use ↑ ↓ to scroll [605 secl
139 (mU)
104
69
34
0
215.9 uV
0 26 51 89 140 215 308 451 600

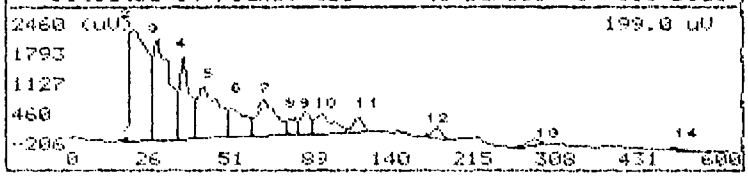

G.C. Ready 10S+ GC Function May 20,95 09:22
-- Analysis No 7 -- Run at - May 20,95 09:09 -
Pk No Name Area Alarm Ret.Time
3 Unknown 14.12 mUS -No- 26.9 sec
4 Unknown 14.32 mUS -No- 32.0 sec
5 Unknown 695.1 mUS -No- 69.4 sec
6 Unknown 752.6 mUS -No- 89.4 sec
7 Unknown 468.4 mUS -No- 143.0 sec
8 Unknown 647.4 mUS -No- 202.5 sec
9 Unknown 145.3 mUS -No- 300.5 sec
10 Unknown 685.9 mUS -No- 324.0 sec
11 Unknown 146.2 mUS -No- 334.0 sec
- Detected 11 peaks. Use ↑ ↓ to scroll [605 secl
139 (mU)
104
69
34
0
207.5 uV
0 26 51 89 140 215 308 451 600

SB7.5-1.5
10 ul

G.C. Ready 105+ GC Function May 20,95 11:06
-- Analysis No 13 -- Run at - May 20,95 10:53 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	0.021	mUS	-No-	16.4	sec
2	Unknown	15.50	mUS	-No-	18.8	sec
3	Unknown	11.03	mUS	-No-	25.0	sec
4	Unknown	6.866	mUS	-No-	35.0	sec
5	Unknown	1.445	mUS	-No-	41.1	sec
6	Unknown	1.[illegible]	mUS	-No-	49.[illegible]	sec
7	Unknown	[illegible]	mUS	-No-	60.[illegible]	sec
8	Unknown	0.[illegible]	mUS	-No-	73.[illegible]	sec
9	Unknown	3.089	mUS	-No-	79.8	sec

- Detected 14 peaks. Use ↑ ↓ to scroll [605 sec]

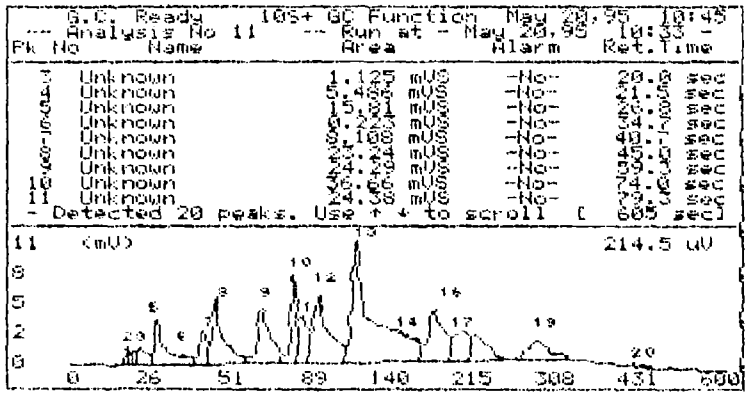


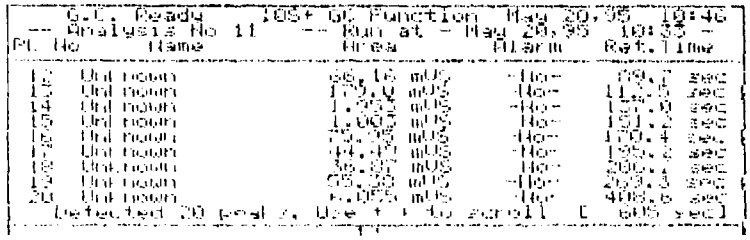
G.C. Ready 105+ GC Function May 20,95 11:07
-- Analysis No 13 -- Run at - May 20,95 10:53 -

Pk No	Name	Area		Alarm	Ret.Time	
5	Unknown	4.335	mUS	-No-	49.8	sec
6	Unknown	5.987	mUS	-No-	60.2	sec
7	Unknown	3.074	mUS	-No-	73.8	sec
8	Unknown	1.082	mUS	-No-	79.8	sec
10	Unknown	4.960	mUS	-No-	98.4	sec
11	Unknown	2.011	mUS	-No-	112.2	sec
12	Unknown	2.431	mUS	-No-	169.6	sec
13	Unknown	2.569	mUS	-No-	263.2	sec
14	Unknown	1.107	mUS	-No-	476.0	sec

- Detected 14 peaks. Use ↑ ↓ to scroll [605 sec]

587-5-3.5
25 ml


G.C. Ready 105+ GC Function May 20,95 10:45
--- Analysis No 11 -- Run at - May 20,95 10:33 -
Pk No Name Area Alarm Ret.Time
1 Unknown 1.412 mV -No- 20.8 sec
2 Unknown 5.403 mV -No- 41.5 sec
3 Unknown 15.201 mV -No- 66.1 sec
4 Unknown 2.201 mV -No- 84.1 sec
5 Unknown 2.108 mV -No- 103.1 sec
6 Unknown 4.044 mV -No- 124.1 sec
7 Unknown 2.044 mV -No- 145.1 sec
8 Unknown 2.044 mV -No- 165.1 sec
9 Unknown 2.044 mV -No- 185.1 sec
10 Unknown 2.044 mV -No- 205.1 sec
11 Unknown 214.58 mV -No- 225.1 sec
- Detected 20 peaks. Use + + to scroll [605 sec]
11 (mV) 214.5 uV
8
5
2
0
0 26 51 89 140 215 308 431 600


G.C. Ready 105+ GC Function May 20,95 10:46
--- Analysis No 11 -- Run at - May 20,95 10:33 -
Pk No Name Area Alarm Ret.Time
12 Unknown 68.16 mV -Hor- 179.7 sec
13 Unknown 179.47 mV -Hor- 113.5 sec
14 Unknown 1.96 mV -Hor- 134.9 sec
15 Unknown 1.003 mV -Hor- 151.4 sec
16 Unknown 44.08 mV -Hor- 170.4 sec
17 Unknown 44.07 mV -Hor- 195.2 sec
18 Unknown 38.07 mV -Hor- 208.1 sec
19 Unknown 65.20 mV -Hor- 253.3 sec
20 Unknown 6.05 mV -Hor- 408.6 sec
- Detected 20 peaks. Use + + to scroll [605 sec]

587-5-5.5
10 ul

G.C. Ready 105+ GC Function May 20,95 10:32
-- Analysis No 10 -- Run at - May 20,95 10:19 -

Pk No	Name	Area		Alarm	Ret.Time	
4	Unknown	201.8	mUS	-No-	26.8	sec
5	Unknown	174.9	mUS	-No-	29.6	sec
6	Unknown	17.2	mUS	-No-	34.6	sec
7	Unknown	583.4	mUS	-No-	41.4	sec
8	Unknown	1.859	USec	-No-	45.1	sec
9	Unknown	24.8	mUS	-No-	49.2	sec
10	Unknown	1.503	USec	-No-	59.6	sec
11	Unknown	1.010	USec	-No-	74.2	sec
12	Unknown	983.9	mUS	-No-	79.6	sec

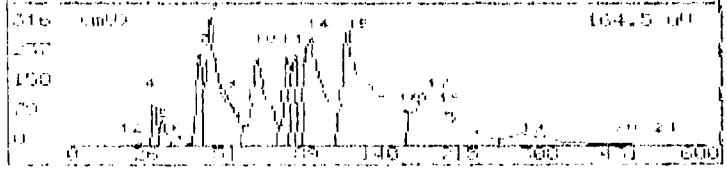
- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]



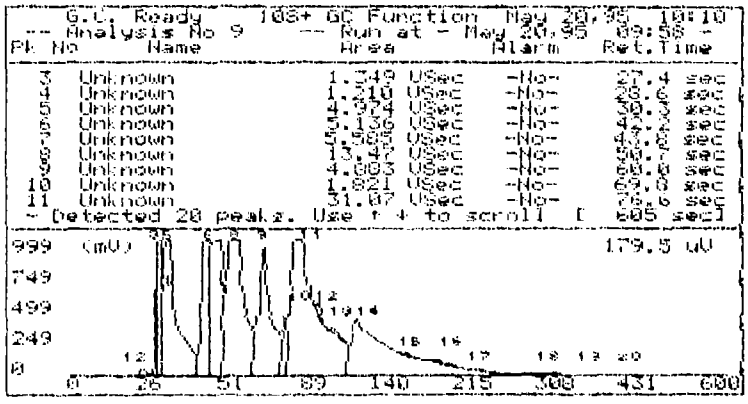
G.C. Ready 105+ GC Function May 20,95 10:32
-- Analysis No 10 -- Run at - May 20,95 10:19 -

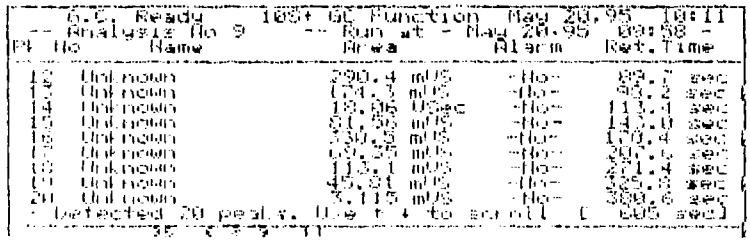
Pk No	Name	Area		Alarm	Ret.Time	
13	Unknown	301.9	mUS	-No-	83.0	sec
14	Unknown	4.506	USec	-No-	90.0	sec
15	Unknown	5.396	USec	-No-	113.9	sec
16	Unknown	0.890	mUS	-No-	151.0	sec
17	Unknown	2.206	USec	-No-	190.4	sec
18	Unknown	1.481	mUS	-No-	195.6	sec
19	Unknown	1.669	USec	-No-	210.4	sec
20	Unknown	14.12	mUS	-No-	405.2	sec
21	Unknown	14.16	mUS	-No-	474.4	sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]

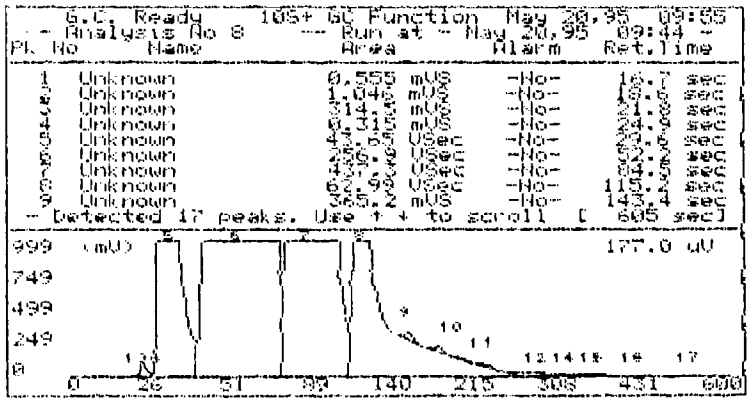


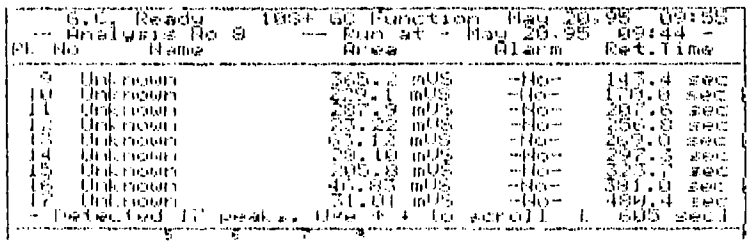
SB7-5-7.5
5 µl

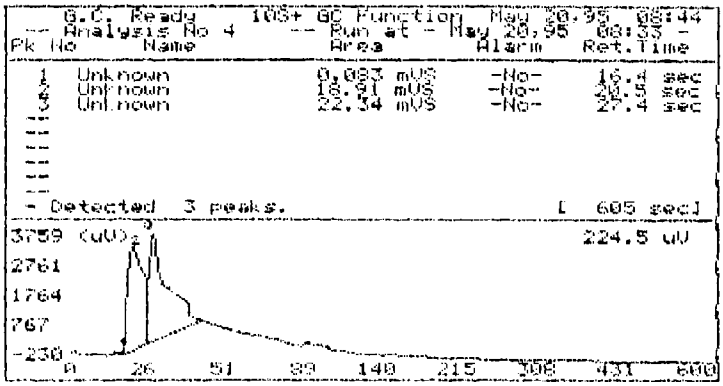

G.C. Ready 100+ GC Function May 20,95 10:10
-- Analysis No 9 -- Run at - May 20,95 09:58 -
Pk No Name Area Alarm Ret.Time
3 Unknown 1.549 USec -No- 20.4 sec
4 Unknown 1.210 USec -No- 26.6 sec
5 Unknown 4.924 USec -No- 43.0 sec
6 Unknown 5.136 USec -No- 44.7 sec
7 Unknown 1.586 USec -No- 54.1 sec
8 Unknown 13.42 USec -No- 65.4 sec
9 Unknown 4.603 USec -No- 69.6 sec
10 Unknown 1.821 USec -No- 73.6 sec
11 Unknown 31.07 USec -No- 78.6 sec
~ Detected 20 peaks. Use ↑ ↓ to scroll [605 sec]
999 (mV)
749
499
249
0
179.5 uV
0 26 51 89 140 215 308 431 600


G.C. Ready 100+ GC Function May 20,95 10:11
-- Analysis No 9 -- Run at - May 20,95 09:58 -
Pk No Name Area Alarm Ret.Time
12 Unknown 290.4 mVS -No- 89.7 sec
13 Unknown 124.3 mVS -No- 93.2 sec
14 Unknown 18.06 USec -No- 113.1 sec
15 Unknown 61.58 mVS -No- 144.0 sec
16 Unknown 230.5 mVS -No- 170.4 sec
17 Unknown 69.25 mVS -No- 200.2 sec
18 Unknown 113.1 mVS -No- 221.4 sec
19 Unknown 45.81 mVS -No- 250.3 sec
20 Unknown 3.115 mVS -No- 300.6 sec
~ Detected 20 peaks. Use ↑ ↓ to scroll [605 sec]

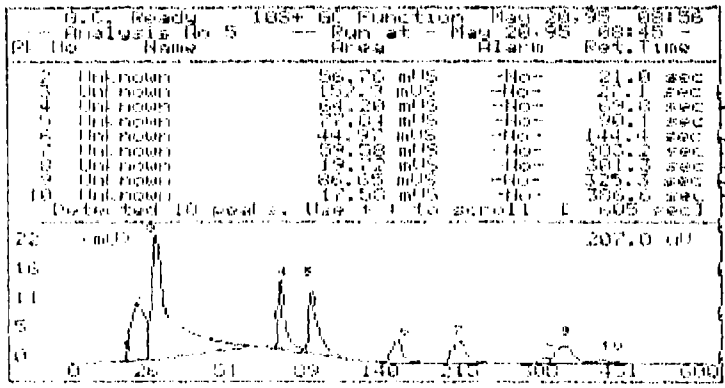
SBT-5.7.5
10 ul


G.C. Ready 105+ GC Function May 20,95 09:55
-- Analysis No 8 --- Run at - May 20,95 09:44 -
Pk No Name Area Alarm Ret.Time
1 Unknown 0.555 mUS -No- 16.7 sec
2 Unknown 1.046 mUS -No- 49.6 sec
3 Unknown 314.4 mUS -No- 91. sec
4 Unknown 431.5 mUS -No- 104. sec
5 Unknown 6443.4 USec -No- 124.6 sec
6 Unknown 6.5 USec -No- 132.6 sec
7 Unknown 6.9 USec -No- 164.6 sec
8 Unknown 6.2 USec -No- 115.4 sec
9 Unknown 365.2 mUS -No- 143.4 sec
- Detected 17 peaks. Use ↑ ↓ to scroll [605 sec]
999 mU
749
499
249
0
177.0 uU
0 26 51 90 140 215 305 431 600


G.C. Ready 105+ GC Function May 20,95 09:55
-- Analysis No 8 --- Run at - May 20,95 09:44 -
Pk No Name Area Alarm Ret.Time
9 Unknown 365.2 mUS -No- 143.4 sec
10 Unknown 1046.1 mUS -No- 170.0 sec
11 Unknown 287.9 mUS -No- 202.6 sec
12 Unknown 224.2 mUS -No- 256.0 sec
13 Unknown 29.12 mUS -No- 269.0 sec
14 Unknown 29.10 mUS -No- 282.4 sec
15 Unknown 205.8 mUS -No- 337.4 sec
16 Unknown 40.83 mUS -No- 381.0 sec
17 Unknown 21.01 mUS -No- 496.4 sec
- Detected 17 peaks. Use ↑ ↓ to scroll [605 sec]

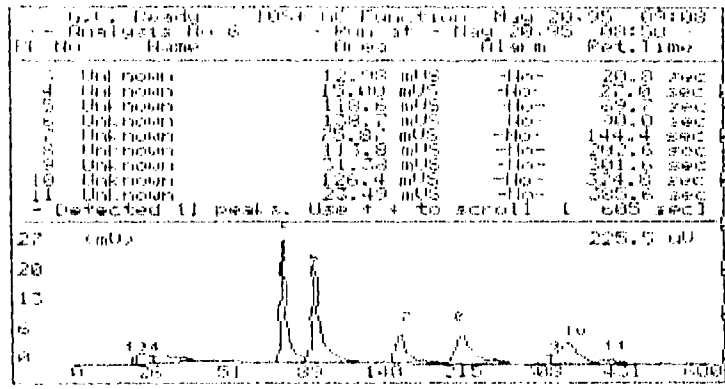


10 ug/l
250 ml

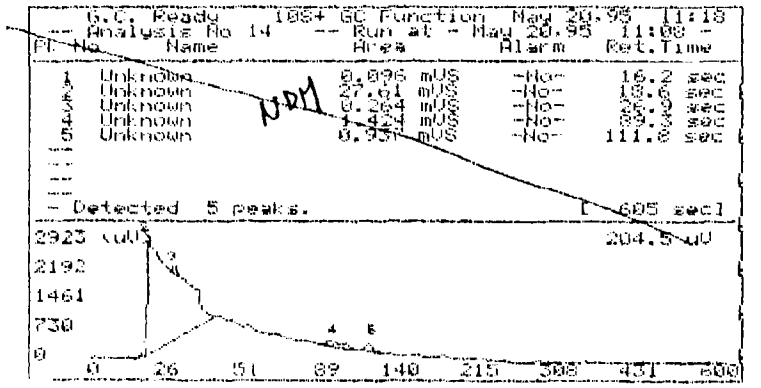


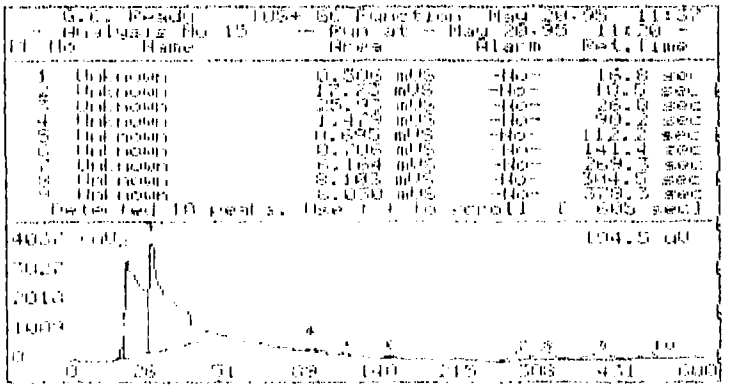
B
TCE
T
PCE
E
X_{MP}
X_o

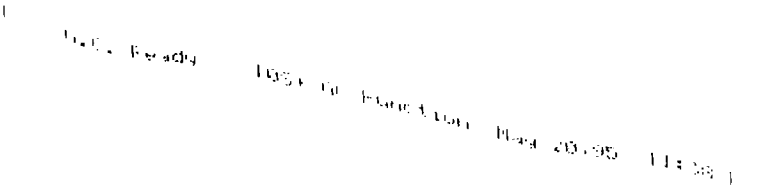
50 ug/l
100 ml



B
TCE
T
PCE
E
$X_{M,P}$
X_o


G.C. Ready 1054 GC Function May 20.95 11:18
-- Analysis No 14 -- Run at - May 20.95 11:00 -
Pk No. Name Area Alarm Ret.Time
1 Unknown 0.096 mUS -No- 16.2 sec
2 Unknown 27.61 mUS -No- 18.6 sec
3 Unknown 0.264 mUS -No- 85.9 sec
4 Unknown 1.424 mUS -No- 99.4 sec
5 Unknown 0.957 mUS -No- 111.8 sec
- Detected 5 peaks.
2925 mV
2192
1461
730
0
61 26 51 89 140 215 308 431 600
204.5 mV


G.C. Ready 1054 GC Function May 20.95 11:37
-- Analysis No 15 -- Run at - May 20.95 11:20 -
Pk No. Name Area Alarm Ret.Time
1 Unknown 0.506 mUS -No- 16.8 sec
2 Unknown 12.22 mUS -No- 18.7 sec
3 Unknown 45.73 mUS -No- 86.6 sec
4 Unknown 1.419 mUS -No- 90.4 sec
5 Unknown 0.885 mUS -No- 112.1 sec
6 Unknown 0.706 mUS -No- 141.4 sec
7 Unknown 5.164 mUS -No- 269.3 sec
8 Unknown 8.183 mUS -No- 304.5 sec
9 Unknown 6.050 mUS -No- 379.3 sec
Detected 10 peaks. Use ↑ ↓ to scroll
4035 mV
2690
1345
0
0 26 51 89 140 215 308 431 600
194.5 mV

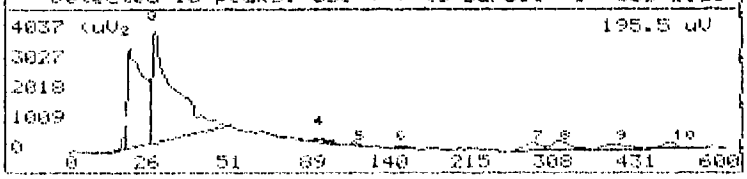

G.C. Ready
1054 GC Function May 20.95 11:38

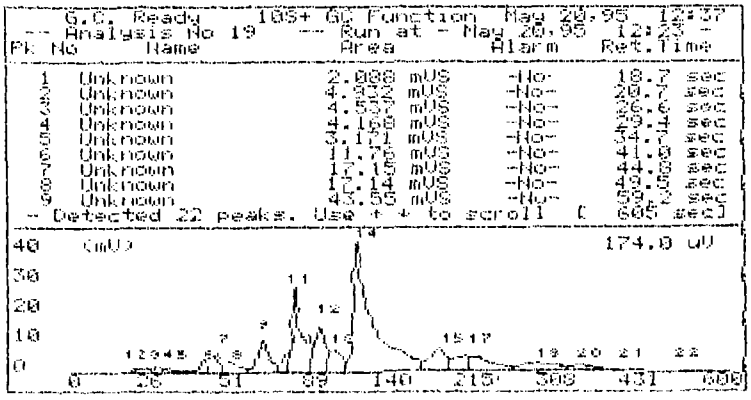
SB7-6-3.5
100 ml

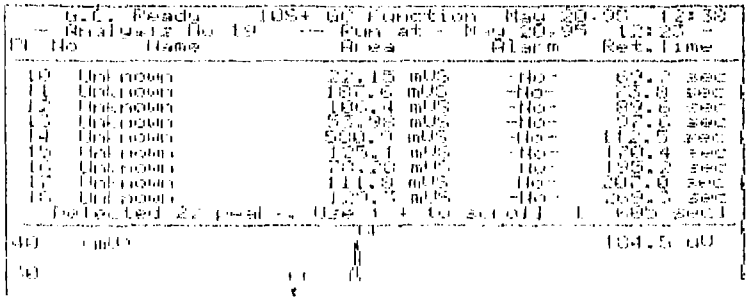
G.C. Ready (GC+ GC Function) May 20,95 11:39
-- Analysis No 15 -- Run at - May 20,95 11:20 --

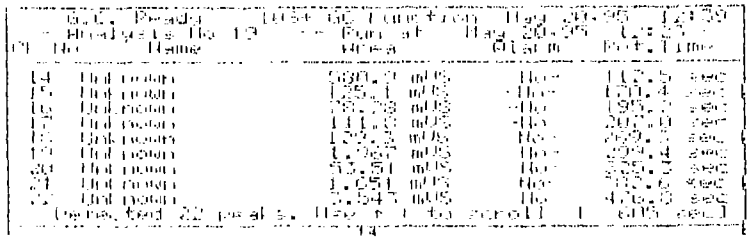
Pk No	Name	Area		Alarm	Ret.Time	
2	Unknown	17.73	mUS	-No-	19.5	sec
3	Unknown	20.03	mUS	-No-	26.1	sec
4	Unknown	1.47	mUS	-No-	96.4	sec
5	Unknown	0.69	mUS	-No-	112.1	sec
6	Unknown	0.70	mUS	-No-	141.4	sec
7	Unknown	6.16	mUS	-No-	169.7	sec
8	Unknown	1.10	mUS	-No-	184.1	sec
9	Unknown	0.05	mUS	-No-	198.1	sec
10	Unknown	6.22	mUS	-No-	471	sec

- Detected 10 peaks. Use ↑ ↓ to scroll [605 sec]




G.C. Ready 105+ GC Function May 20,95 12:37
-- Analysis No 19 -- Run at - May 20,95 12:25 -
Pk No Name Area Alarm Ret.Time
1 Unknown 2.000 mUS -No- 18.7 sec
2 Unknown 44.5 mUS -No- 20.7 sec
3 Unknown 4.5 mUS -No- 26.6 sec
4 Unknown 34.1 mUS -No- 29.4 sec
5 Unknown 34.1 mUS -No- 44.4 sec
6 Unknown 11.7 mUS -No- 1.4 sec
7 Unknown 15.1 mUS -No- 1.5 sec
8 Unknown 15.1 mUS -No- 1.5 sec
9 Unknown 45.5 mUS -No- 1.5 sec
- Detected 22 peaks. Use + + to scroll [605 secl
40 (mU) 174.0 uU
30
20
10
0
0 36 81 89 140 215 508 431 600


G.C. Ready 105+ GC Function May 20,95 12:38
-- Analysis No 19 -- Run at - May 20,95 12:25 -
Pk No Name Area Alarm Ret.Time
10 Unknown 22.15 mUS -No- 82.7 sec
11 Unknown 180.6 mUS -No- 92.8 sec
12 Unknown 100.4 mUS -No- 99.6 sec
13 Unknown 57.98 mUS -No- 107.6 sec
14 Unknown 580.7 mUS -No- 117.5 sec
15 Unknown 195.1 mUS -No- 120.4 sec
16 Unknown 78.20 mUS -No- 195.2 sec
17 Unknown 111.8 mUS -No- 207.0 sec
18 Unknown 1.291 mUS -No- 229.4 sec
- Detected 22 peaks. Use + + to scroll [605 secl
40 (mU) 104.5 uU
30

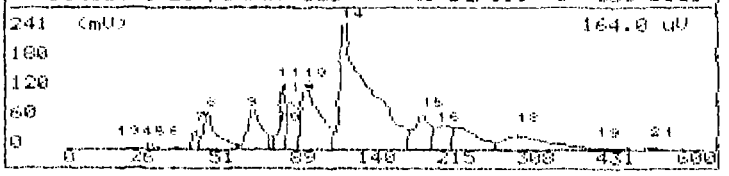

G.C. Ready 105+ GC Function May 20,95 12:39
-- Analysis No 19 -- Run at - May 20,95 12:25 -
Pk No Name Area Alarm Ret.Time
14 Unknown 580.7 mUS -No- 117.5 sec
15 Unknown 195.1 mUS -No- 120.4 sec
16 Unknown 78.20 mUS -No- 195.2 sec
17 Unknown 111.8 mUS -No- 207.0 sec
18 Unknown 1.291 mUS -No- 229.4 sec
19 Unknown 1.291 mUS -No- 229.4 sec
20 Unknown 53.51 mUS -No- 235.4 sec
21 Unknown 1.051 mUS -No- 236.6 sec
22 Unknown 3.547 mUS -No- 476.0 sec
- Detected 22 peaks. Use + + to scroll [605 secl

SB7-7-5.5
10 ul

G.C. Ready 105+ GC Function May 20,95 12:21
-- Analysis No 18 -- Run at - May 20,95 12:10 -

Pk No	Name	Area		Alarm	Ret.Time	
4	Unknown	27.10	mUS	-No-	26.0	sec
5	Unknown	11.59	mUS	-No-	29.4	sec
6	Unknown	1.603	mUS	-No-	34.7	sec
7	Unknown	94.98	mUS	-No-	41.0	sec
8	Unknown	364.9	mUS	-No-	55.4	sec
9	Unknown	441.9	mUS	-No-	60.4	sec
10	Unknown	382.6	mUS	-No-	70.2	sec
11	Unknown	385.5	mUS	-No-	74.1	sec
12	Unknown	644.5	mUS	-No-	79.5	sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 105+ GC Function May 20,95 12:22
-- Analysis No 18 -- Run at - May 20,95 12:10 -

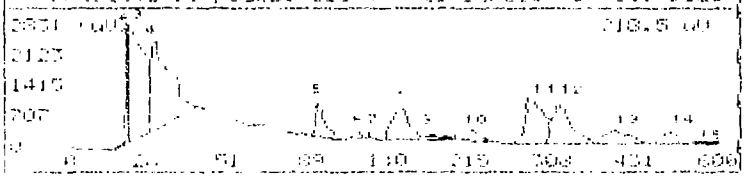
Pk No	Name	Area		Alarm	Ret.Time	
13	Unknown	1.625	USec	-No-	93.0	sec
14	Unknown	5.384	USec	-No-	112.9	sec
15	Unknown	1.168	USec	-No-	170.6	sec
16	Unknown	818.8	mUS	-No-	194.6	sec
17	Unknown	1.256	USec	-No-	206.4	sec
18	Unknown	2.431	USec	-No-	402.8	sec
19	Unknown	10.04	mUS	-No-	418.0	sec
20	Unknown	57.13	mUS	-No-	480.3	sec
21	Unknown	30.69	mUS	-No-	477.6	sec

- Detected 21 peaks. Use ↑ ↓ to scroll [605 sec]

G.C. Ready Test GC Function May 20,95 11:54
-- Analysis No 16 -- Run at - May 20,95 11:44 -

Pk No.	Name	Area	Alarm	Ret.Time
1	Unknown	0.112 mUS	-No-	16.5 sec
2	Unknown	2.018 mUS	-No-	18.0 sec
3	Unknown	11.55 mUS	-No-	20.6 sec
4	Unknown	12.44 mUS	-No-	26.5 sec
5	Unknown	4.961 mUS	-No-	31.0 sec
6	Unknown	0.697 mUS	-No-	112.7 sec
7	Unknown	2.481 mUS	-No-	142.1 sec
8	Unknown	10.92 mUS	-No-	146.0 sec
9	Unknown	0.755 mUS	-No-	150.5 sec

(Detected 10 peaks. Use ↑ ↓ to scroll [0.05 sec]

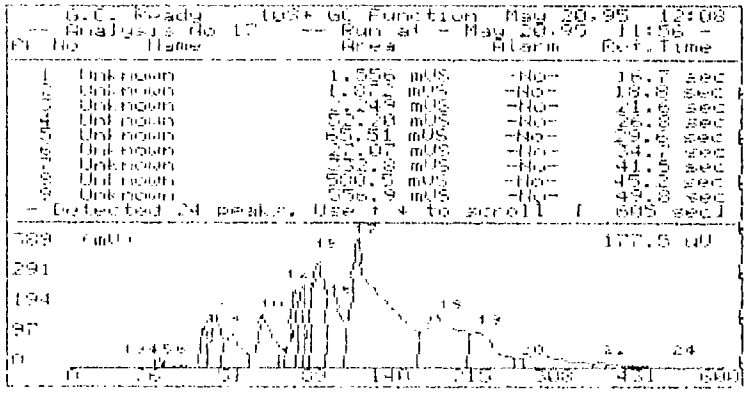


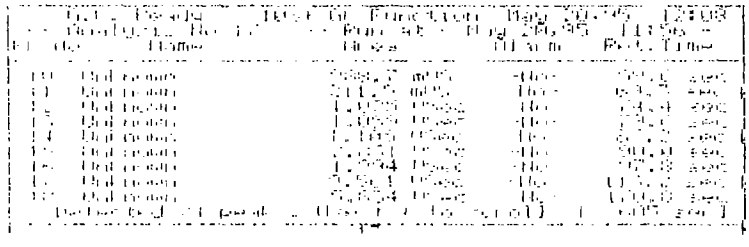
G.C. Ready GC Function May 20,95 11:55
Analysis No 15 -- Run at - May 20,95 11:44 -

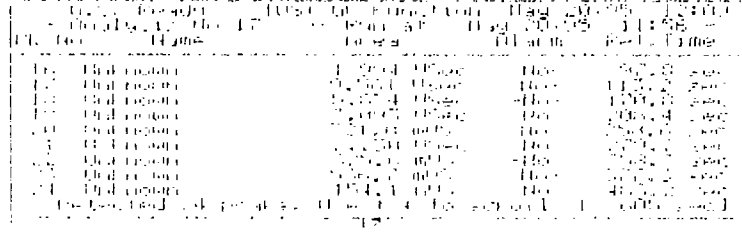
Pk No.	Name	Area	Alarm	Ret.Time
7	Unknown	2.481 mUS	-No-	142.1 sec
8	Unknown	10.92 mUS	-No-	146.0 sec
9	Unknown	0.755 mUS	-No-	150.5 sec
10	Unknown	5.571 mUS	-No-	196.4 sec
11	Unknown	24.33 mUS	-No-	211.6 sec
12	Unknown	12.38 mUS	-No-	384.0 sec
13	Unknown	1.183 mUS	-No-	425.6 sec
14	Unknown	1.074 mUS	-No-	435.0 sec
15	Unknown	2.215 mUS	-No-	600.1 sec

(Detected 15 peaks. Use ↑ ↓ to scroll [0.05 sec]

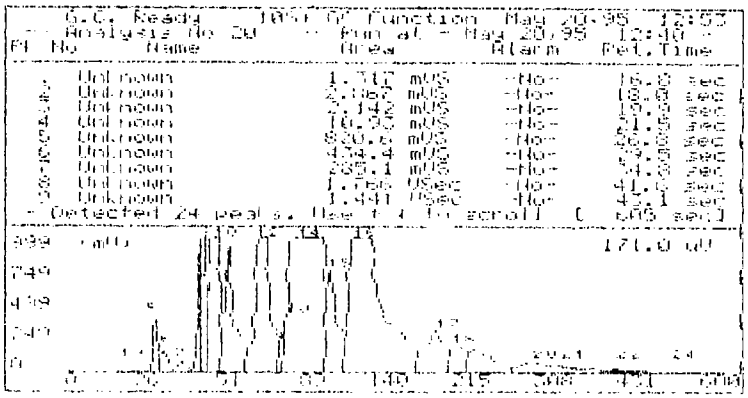
SB7-7-7.5
10 ul

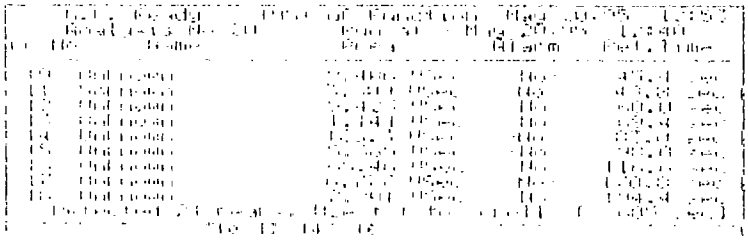

G.C. Ready
User GC Function
May 20,95 12:08
-- Analysis No 17 --
-- Run at - May 20,95 11:56 -
Pk No
Name
Area
Alarm
Ret.Time
Unknown
- Detected 24 peak.s. Use ↑ ↓ to scroll -
177.5 uV

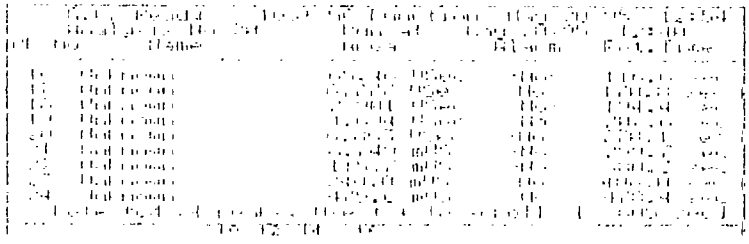




SBT-7-1.5
20 ul

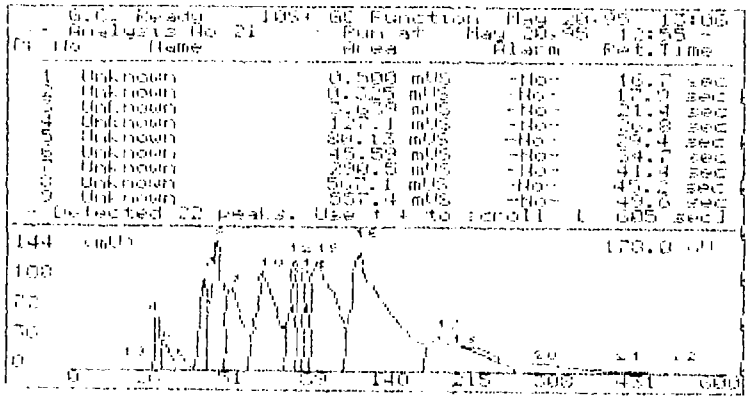

G.C. Ready
Analysis No 20
Run at - May 20,95 12:40
Pk No Name Area Alarm Ret.Time
1 Unknown 1.717 mUS -No- 16.0 sec
2 Unknown 2.062 mUS -No- 18.9 sec
3 Unknown 2.142 mUS -No- 19.6 sec
4 Unknown 16.25 mUS -No- 21.5 sec
5 Unknown 820.6 mUS -No- 46.8 sec
6 Unknown 474.4 mUS -No- 49.5 sec
7 Unknown 285.1 mUS -No- 54.0 sec
8 Unknown 1.766 USec -No- 41.6 sec
9 Unknown 1.441 USec -No- 42.1 sec
Detected 24 peaks. Use ↑ ↓ to scroll (605 sec)
999 mV
749
499
249
0
171.0 uV
0 30 61 92 130 215 308 451 600

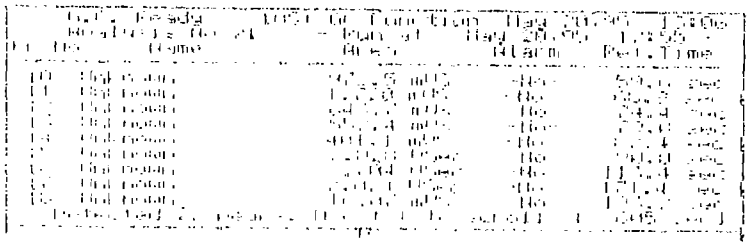


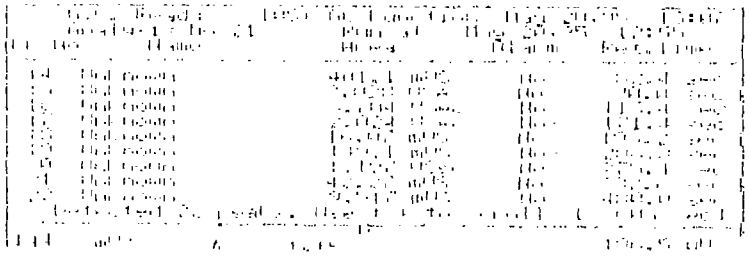


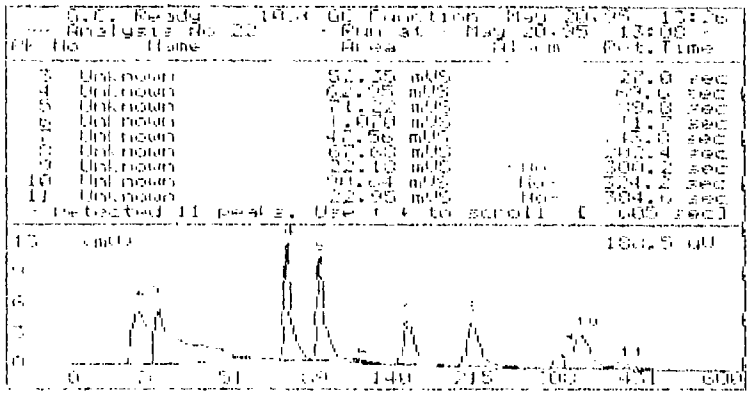
SB7-7-15

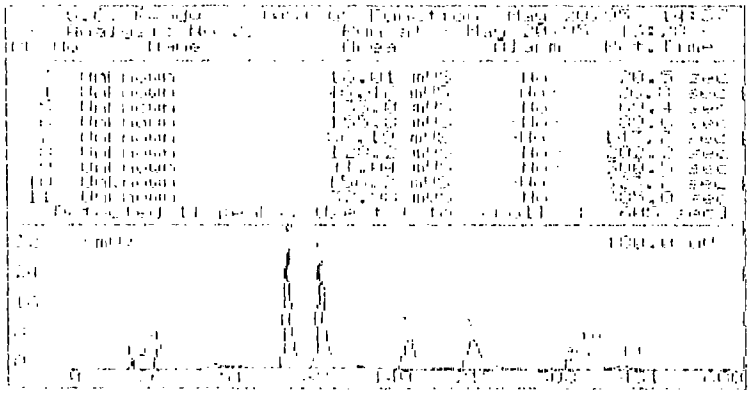
5 ml

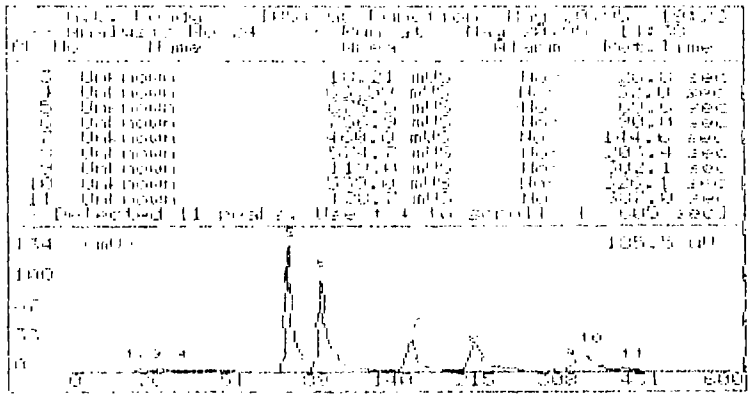

G.C. Ready 1051 GC Function Mar 20,95 12:08
Analysis No 21 Run at Mar 20,95 12:55
Pk No Name Area Alarm Ret.Time
1 Unknown 0.500 mVs -No- 10.1 sec
2 Unknown 0.525 mVs -No- 13.3 sec
3 Unknown 2.638 mVs -No- 21.4 sec
4 Unknown 12.71 mVs -No- 36.8 sec
5 Unknown 80.13 mVs -No- 54.4 sec
6 Unknown 45.59 mVs -No- 64.1 sec
7 Unknown 290.6 mVs -No- 141.4 sec
8 Unknown 522.1 mVs -No- 45.0 sec
9 Unknown 557.4 mVs -No- 49.6 sec
Detected 22 peaks. Use ↑ ↓ to scroll 1.605 sec
144 mVs
108
72
36
0
170.0 Ch
0 70 140 215 300 430 600







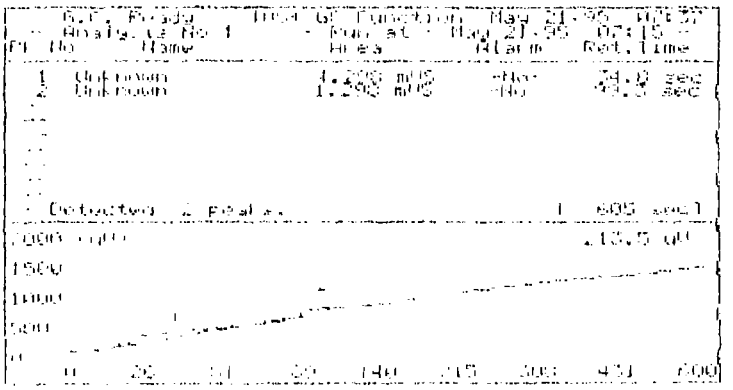


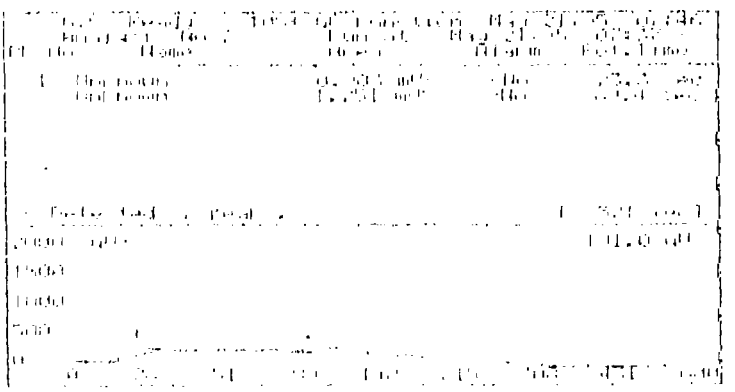


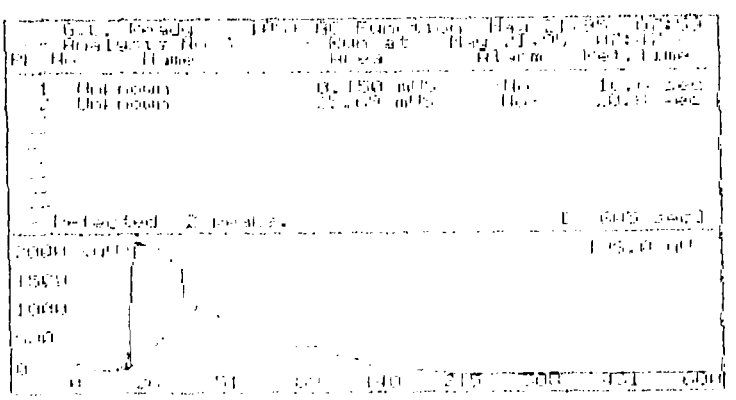
GC Data (5/20/95)

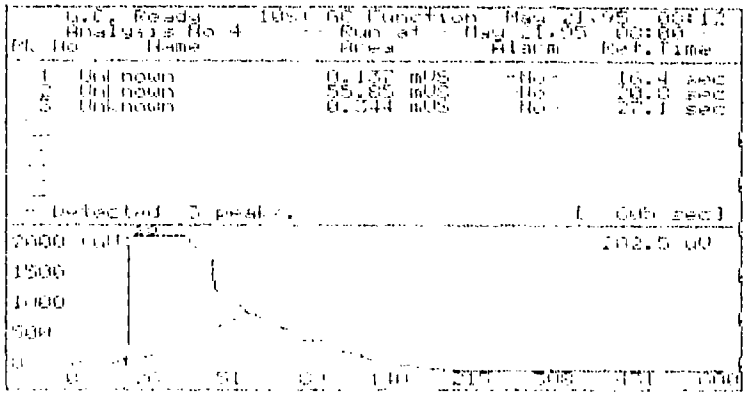
SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
SB7-5-3.5	0.0	153.6	8.2	104.2	0.0	0.0	0.0	266.0
SB7-5-5.5	0.0	16390.0	0.0	0.0	0.0	0.0	0.0	16390.0
SB7-5-7.5	0.0	0.0	5430.4	0.0	0.0	0.0	0.0	5430.4
SB7-5-7.5	34880.4	4752.2	2425.5	1624.2	0.0	781.2	265.8	44729.4
SB7-5-1.5	0.0	2.1	0.0	0.0	0.0	0.0	0.0	2.1
SB7-6-3.5	0.0	0.9	0.8	0.0	20.3	5.2	44.6	71.8
SB7-6-5.5	0.0	2.8	11.1	0.0	52.9	0.0	0.0	66.8
SB7-7-1.5	4059.7	0.0	0.0	17318.5	83207.6	0.0	1829.4	106415.1
SB7-7-3.5	63.3	259.9	0.0	332.4	11.9	136.2	21.0	824.8
SB7-7-5.5	604.2	10124.5	0.0	9523.1	0.0	0.0	326.2	20578.0
SB6-7-7.5	1632.3	18665.8	0.0	0.0	82930.5	0.0	18454.7	121683.3

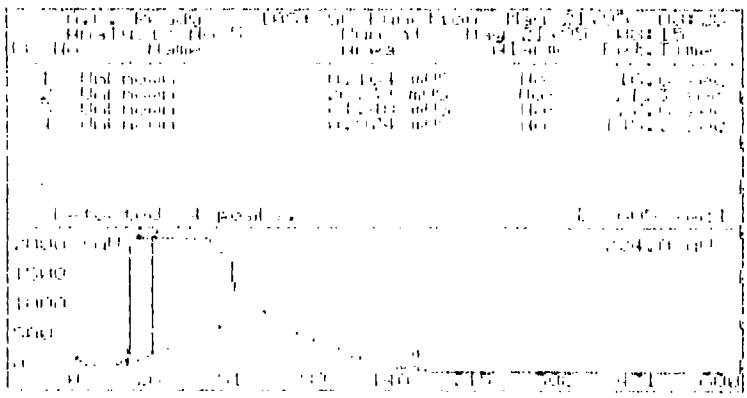
5/21/95

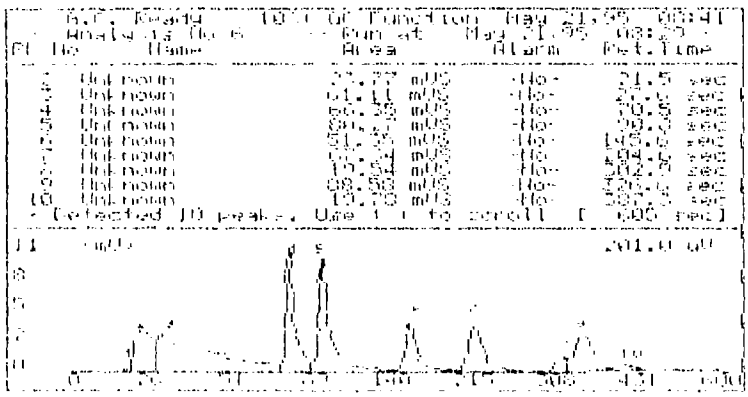


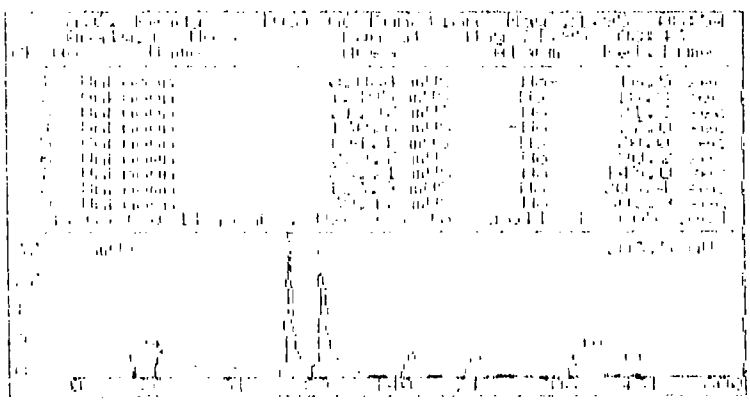


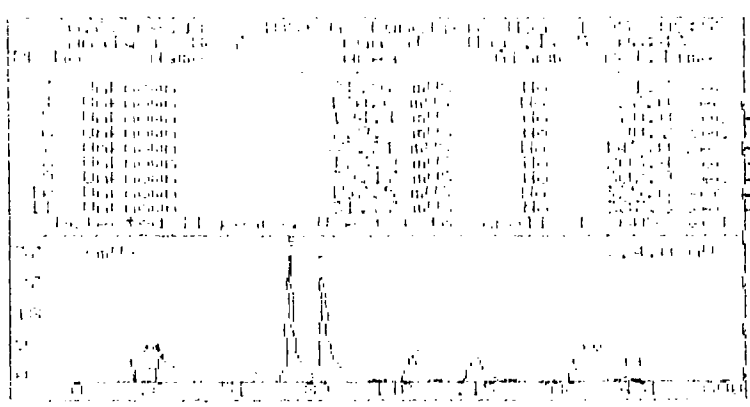


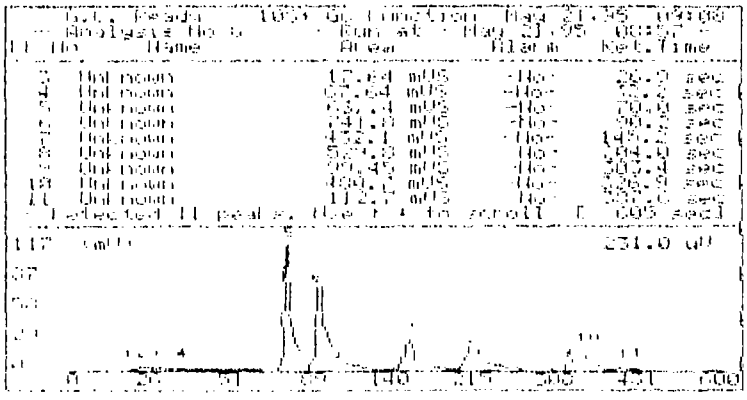




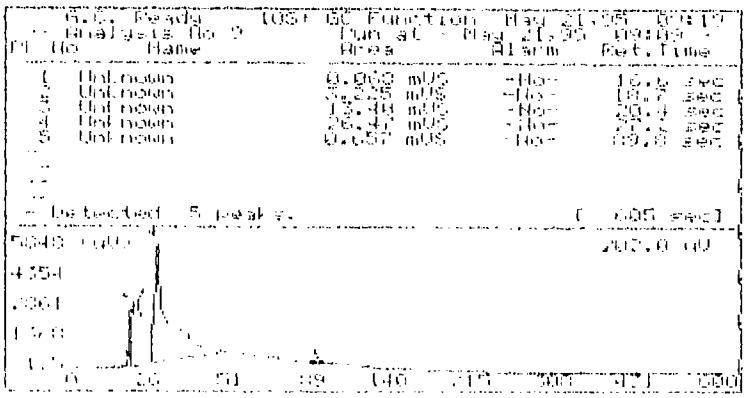




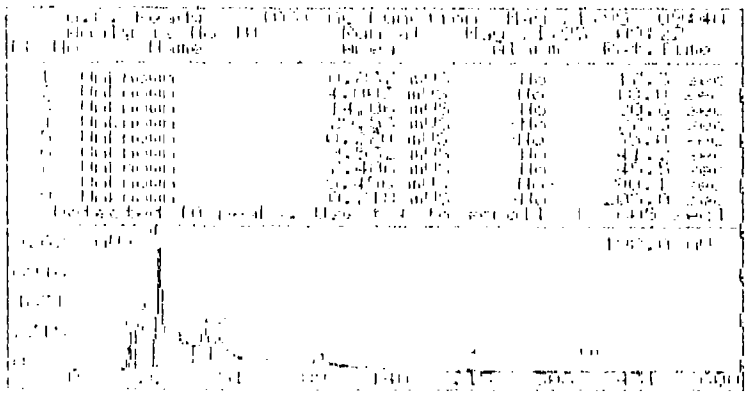

B
TCE
T
PCE
E
m,p-X
o-X



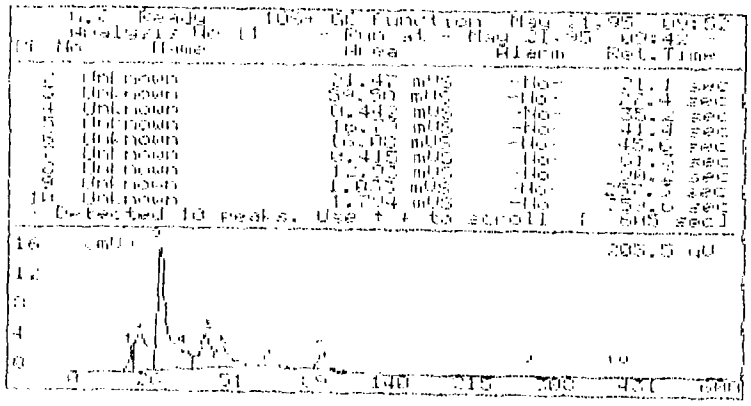
MW28
(Dev Water)
100 ul



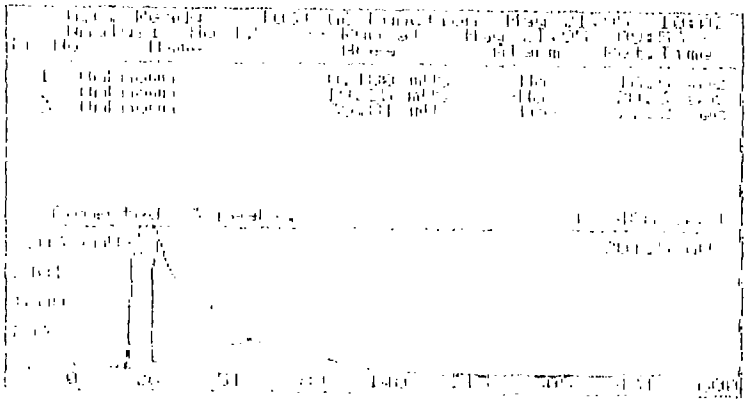
MW29
(Dev. Water)
100 ul



MW29
(Dew. water)
200 ul



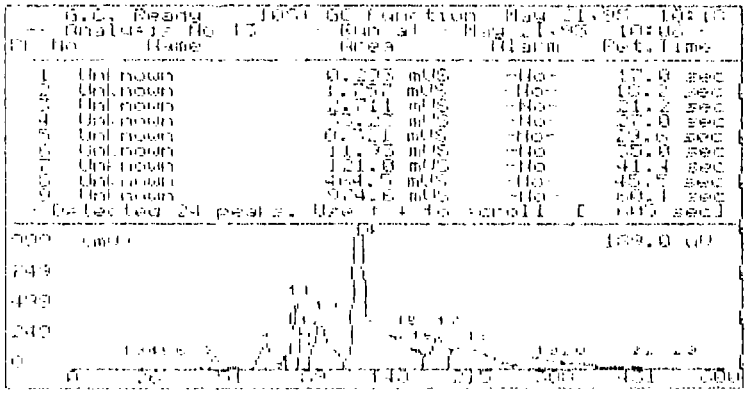
Syringe
Blank
250 B

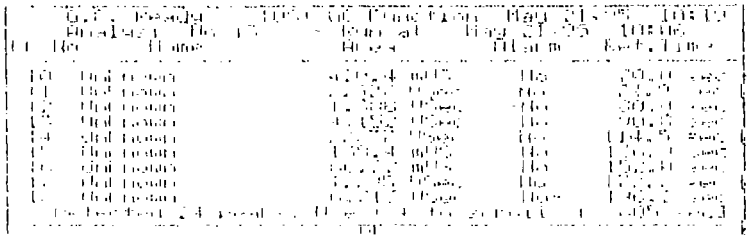


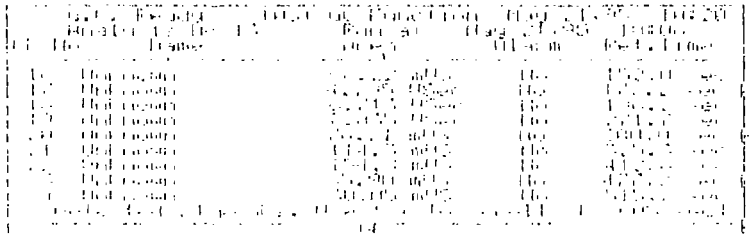
SBT-8-3.0

20 ul

12.3g



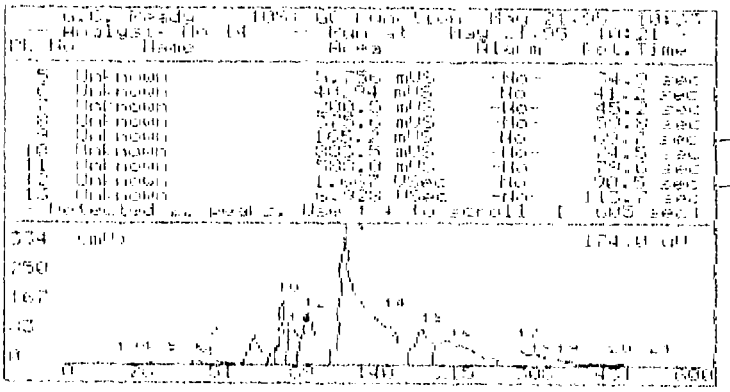




387-8-3.0

10 ul

12.3 g

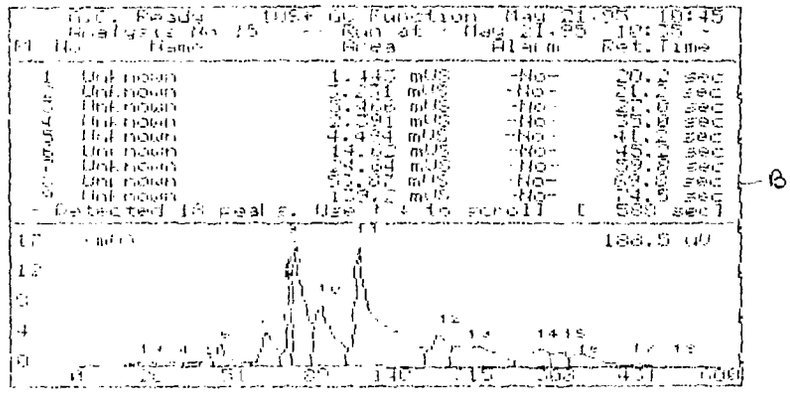




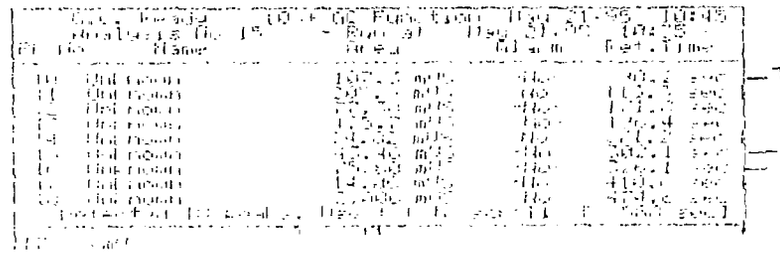
SW7-8.5.5

10 µl

11.9g



B



TCE

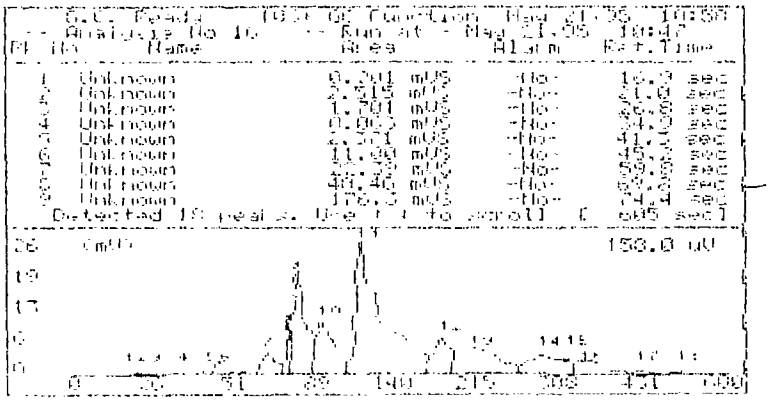
C

Vmp

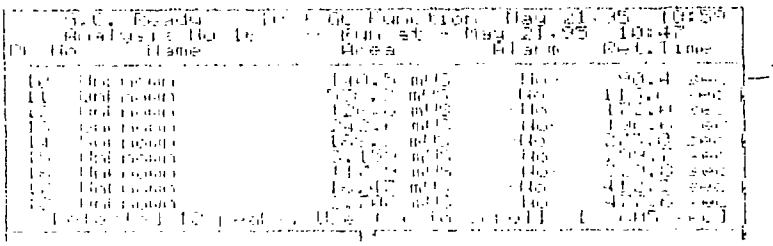
SB7-8-5.5 Dup

10 ul

13.4 g

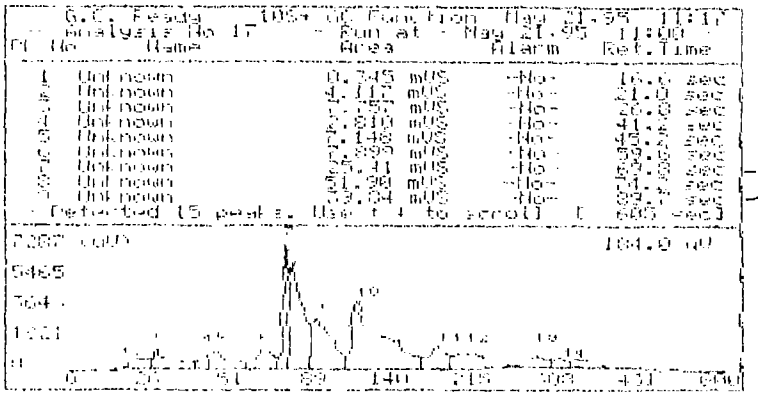


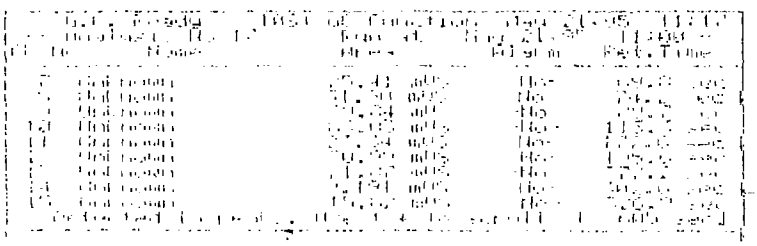
B



TCE

SB7-8-7.5
10 ul
12.6g

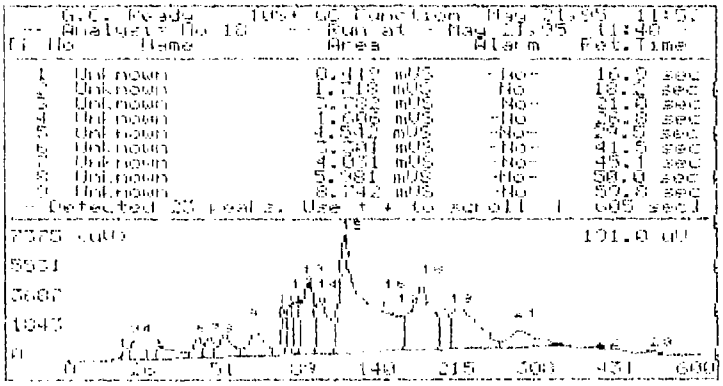




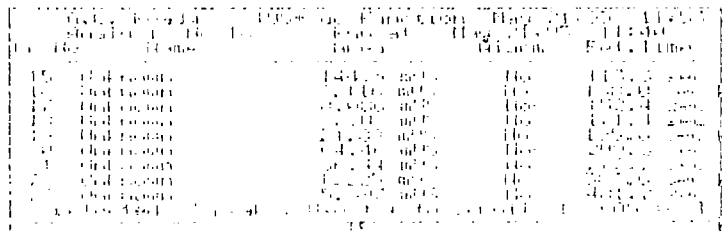
SB5-2.20

10 ul

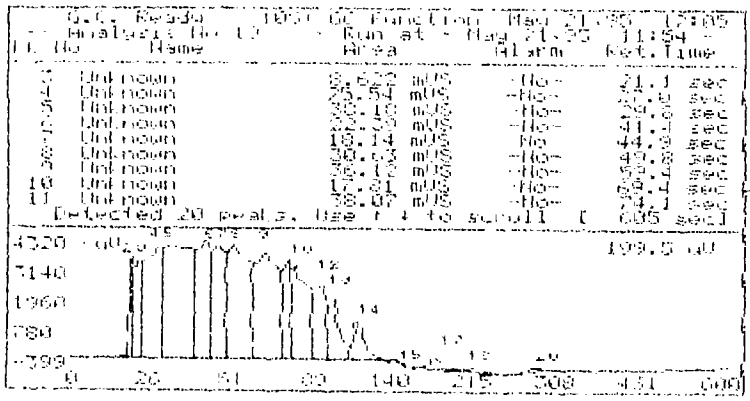
10.1 g

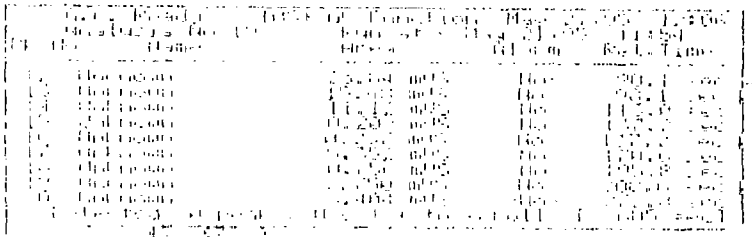




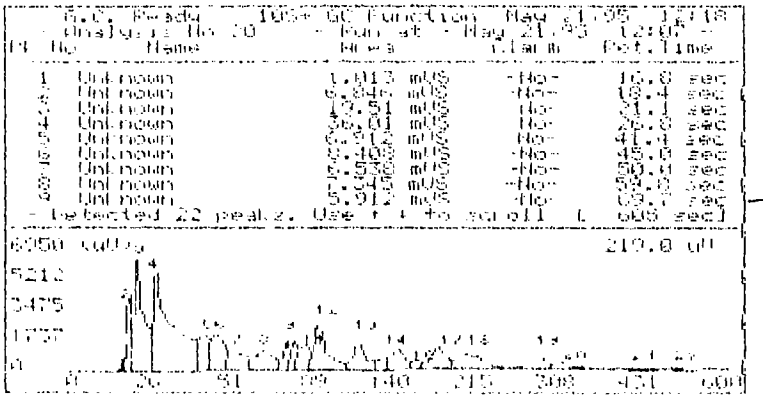


385-2-3.5
100 ul
9.8 g





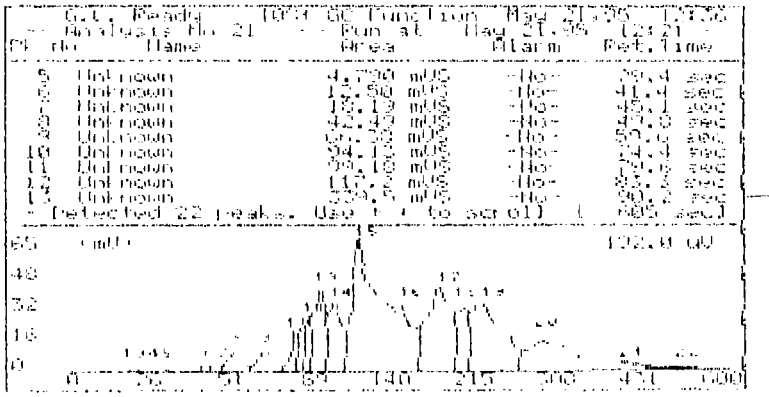
SB5-2-5.0
100 ul
11.1 g

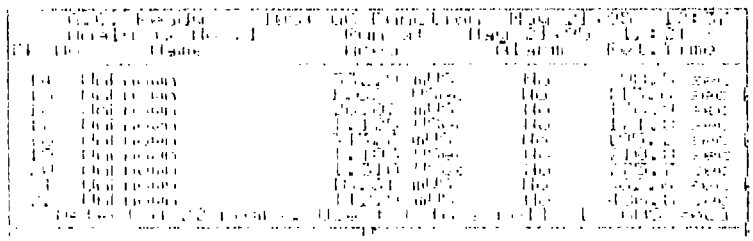

Unknown
Unknown
Unknown

SB5-2-7.5

10 ul

10.7g

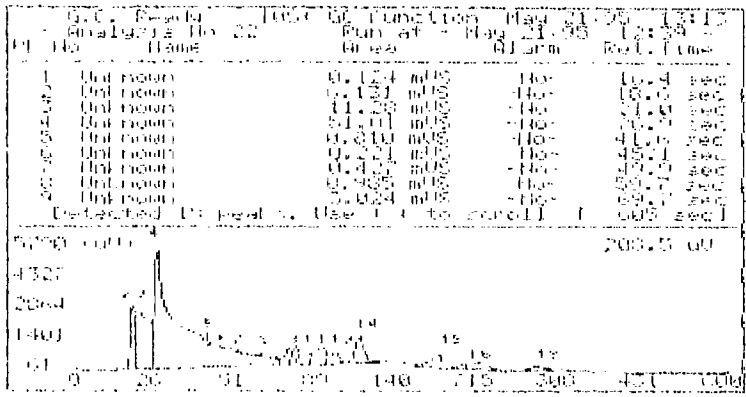




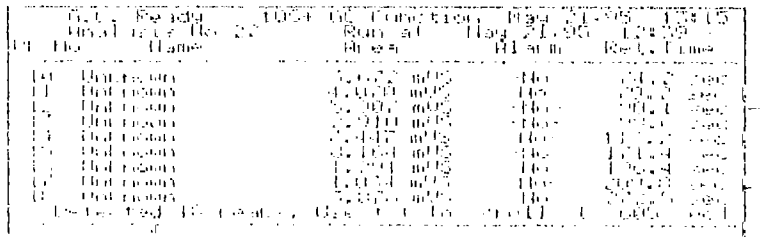
SB5-2-3.5

100 ul

9.8 g

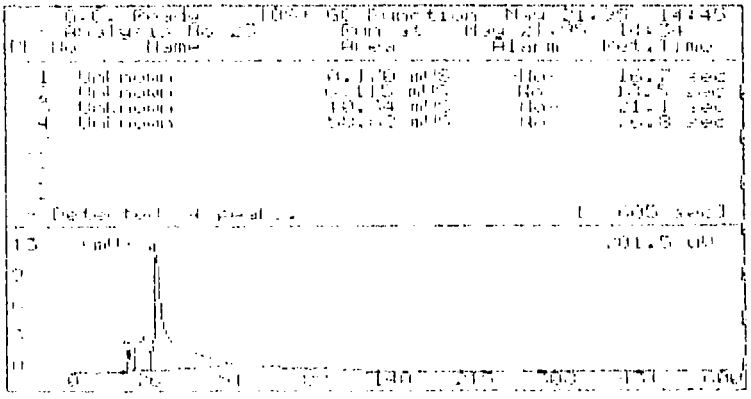


B

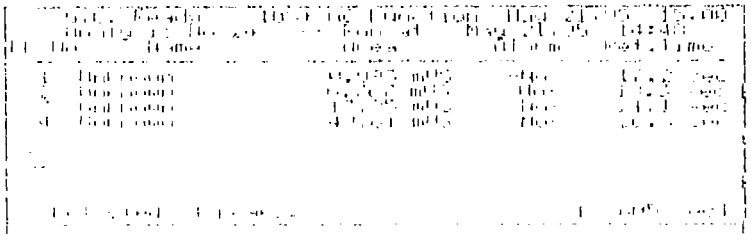


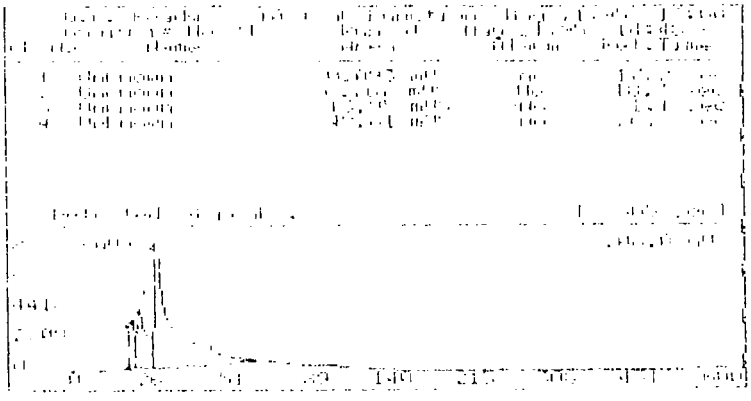
TCL

SB5-3-1.5

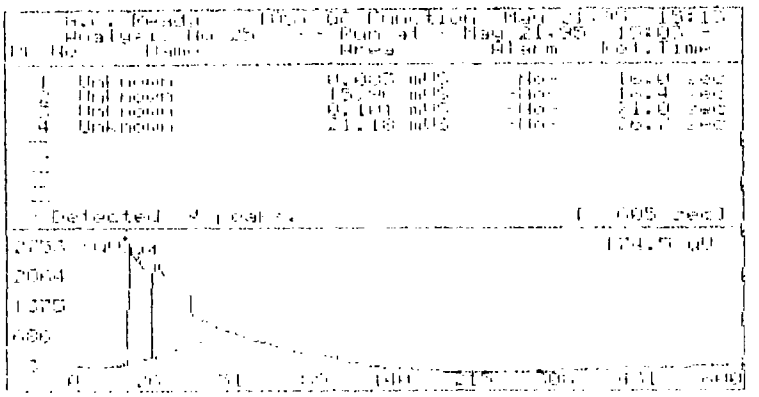


SB5-3-3.5

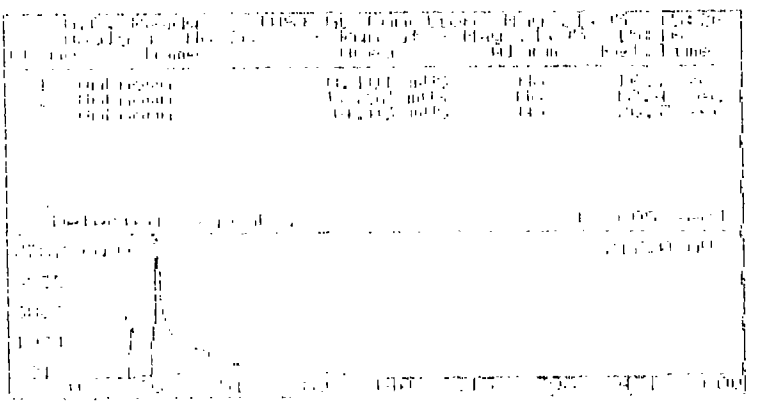




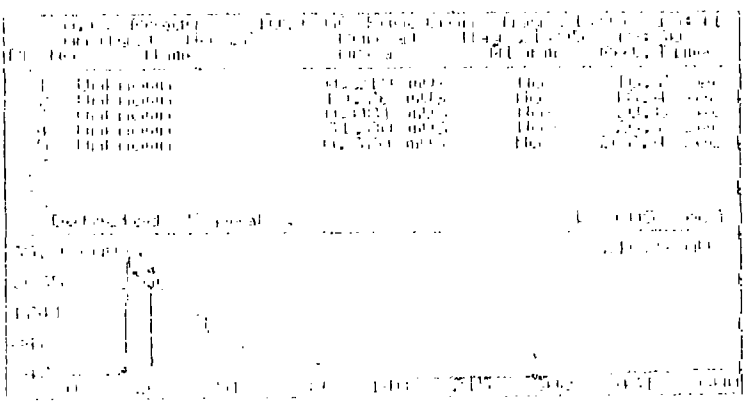
SB5-3-5.5



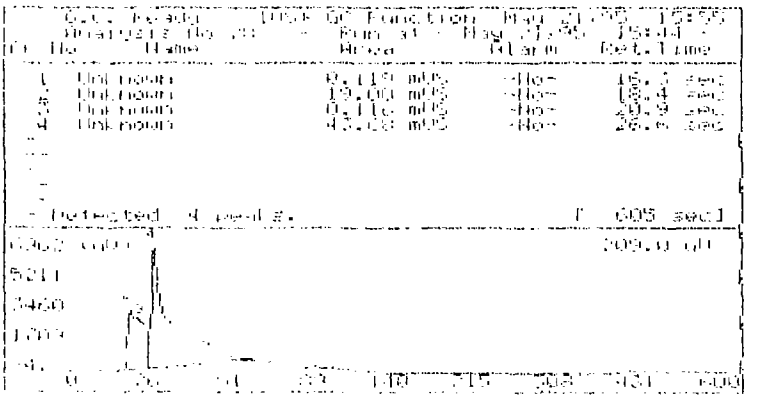
SB5-3-7.5



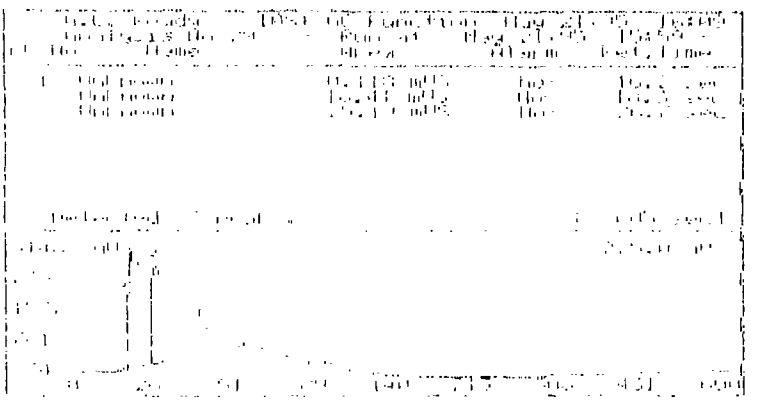
SB5-4-1.5



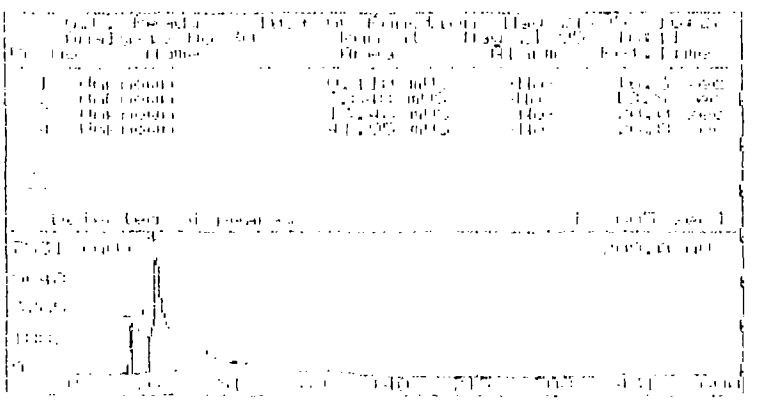
SBS-4-3.5



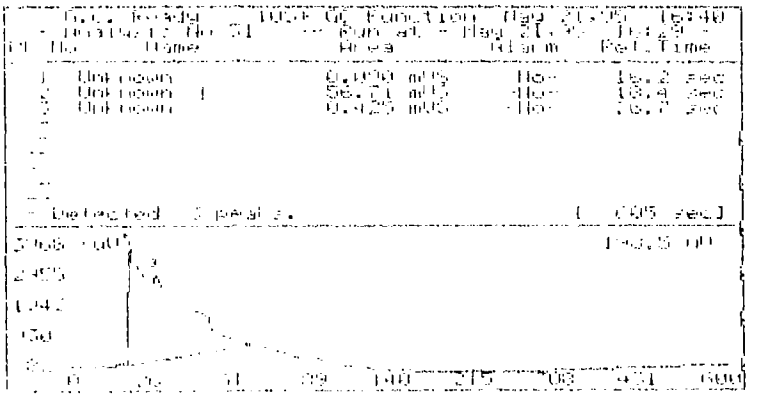
SBS-4-5.5 Dup



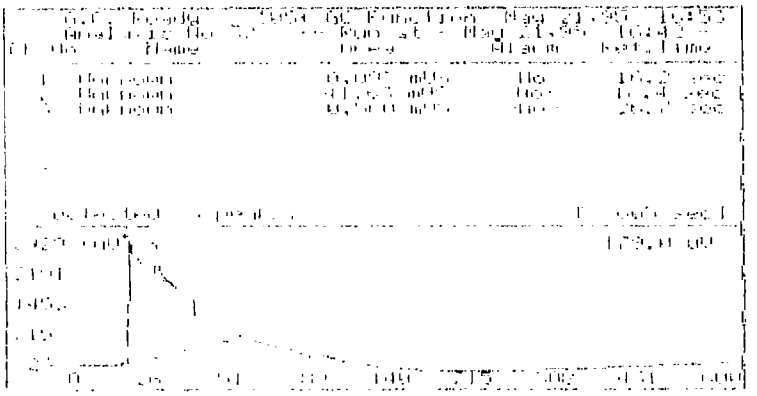
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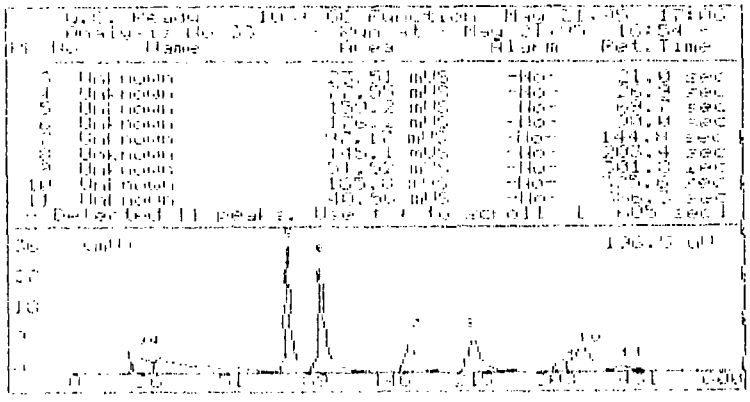


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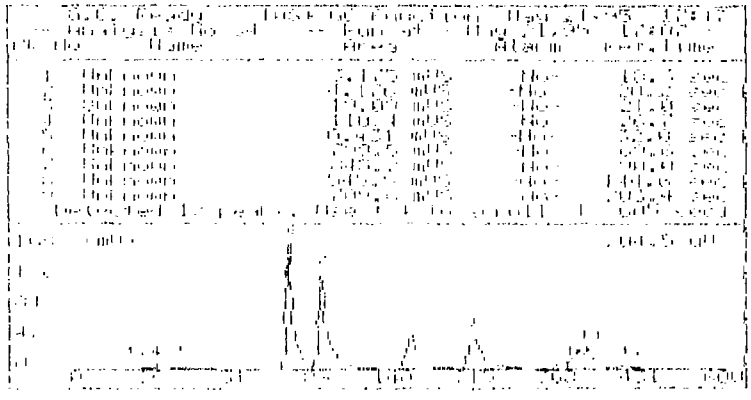


SBS-1-1.5

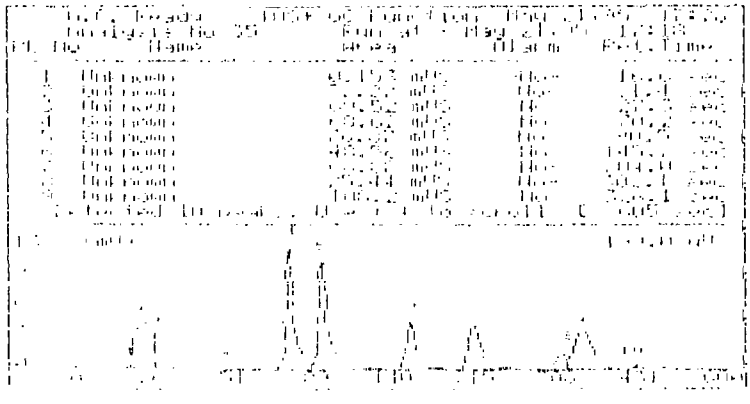




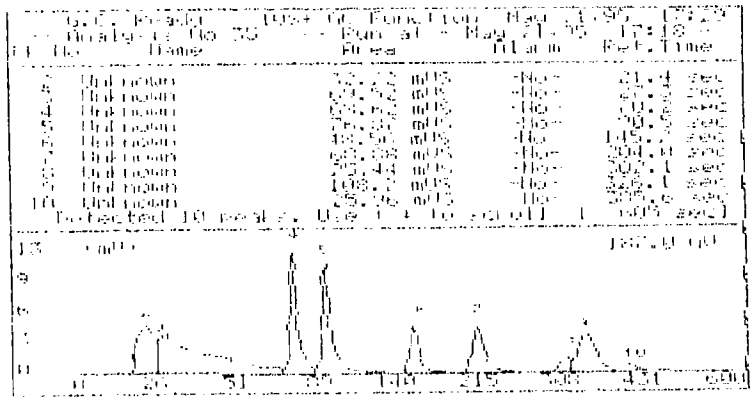
50 ug/l std



50 ug/l std



10 ug/l std

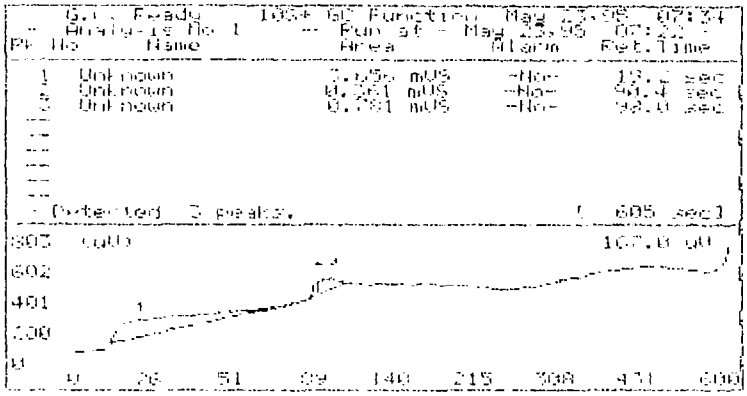


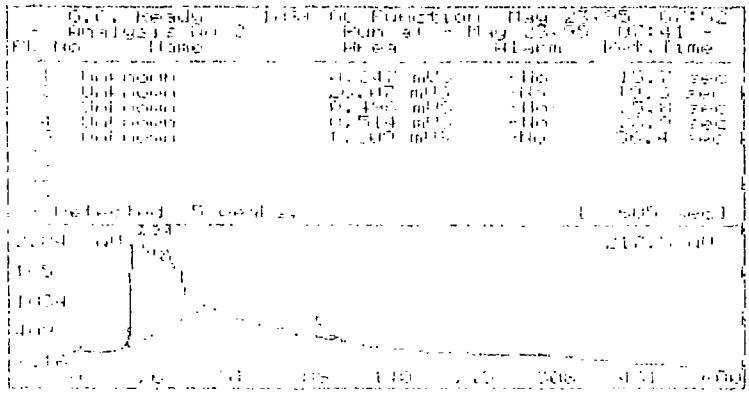
10 ug/l std

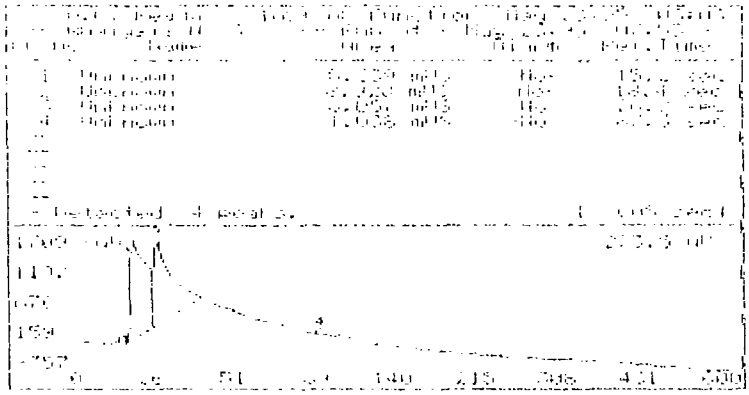
GC Data (5/21/95)

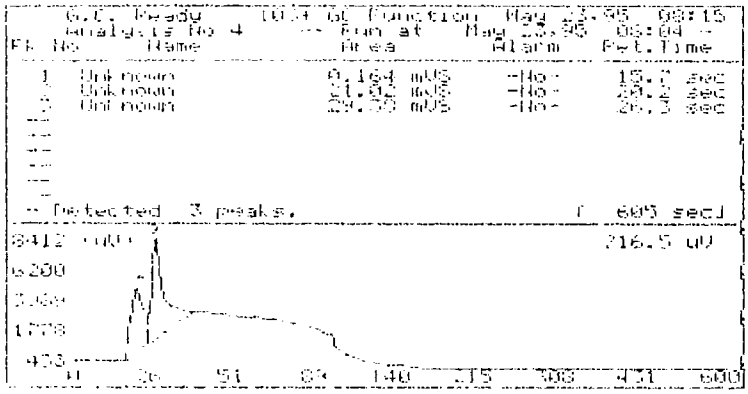
SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
MW29	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.7
MW30	0.0	3.2	0.0	0.0	0.0	0.0	0.0	3.2
MW28	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
SB7-8-3.0	967.7	8316.4	0.0	0.0	70.1	270.0	0.0	9624.1
SB7-8-3.0	760.5	6677.9	0.0	0.0	47.3	330.1	0.0	7815.9
SB7-8-5.5	256.3	444.3	0.0	0.0	805.4	370.1	0.0	1876.1
SB7-8-5.5 Dup	170.7	516.6	0.0	0.0	0.0	512.6	0.0	1199.9
SB7-8-7.5	114.2	155.8	0.0	0.0	160.9	73.1	0.0	504.0
								0.0
SB5-2-2.0	0.0	176.8	0.0	474.5	0.0	0.0	33.5	684.8
SB5-2-3.5	10.3	13.0	0.0	0.0	0.0	0.0	0.0	23.3
SB5-2-5.0	3.0	9.5	0.0	0.0	11.9	0.0	0.0	24.4
SB5-2-7.5	0.0	1563.4	0.0	0.0	0.0	0.0	0.0	1563.4
SB5-2-3.5	1.7	3.0	0.0	0.0	0.0	0.0	0.0	4.7

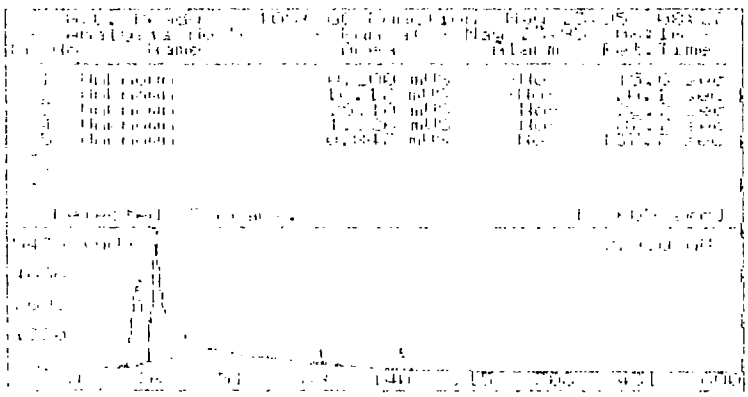
5/23/95


GC Ready
Analysis No 1
Pk No Name Area Alarm Ret.Time
1 Unknown 2.495 mVS -No- 19.2 sec
2 Unknown 0.261 mVS -No- 44.4 sec
3 Unknown 0.791 mVS -No- 90.0 sec
Detected 3 peaks.
605 sec
807
602
401
200
0
0 26 51 89 140 215 308 431 600

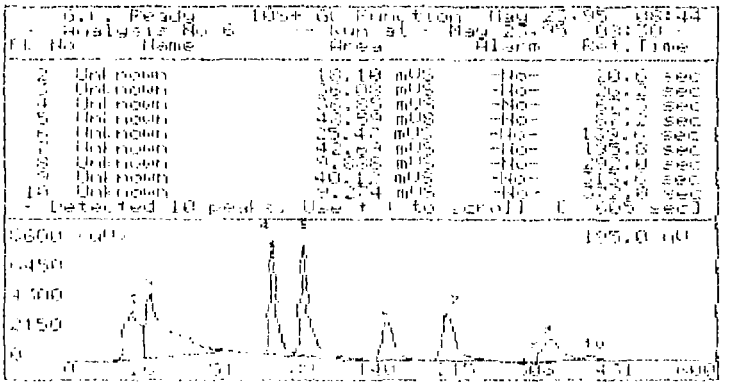

GC Ready
Analysis No 2
Pk No Time Area Alarm Ret.Time
1 Unknown 0.240 mVS -No- 19.2 sec
2 Unknown 0.115 mVS -No- 44.4 sec
3 Unknown 0.455 mVS -No- 90.0 sec
4 Unknown 0.504 mVS -No- 215.8 sec
5 Unknown 1.197 mVS -No- 308.4 sec
Detected 5 peaks.
605 sec


GC Ready
Analysis No 3
Pk No Time Area Alarm Ret.Time
1 Unknown 0.239 mVS -No- 19.2 sec
2 Unknown 0.115 mVS -No- 44.4 sec
3 Unknown 0.455 mVS -No- 90.0 sec
4 Unknown 1.035 mVS -No- 215.8 sec
Detected 4 peaks.
605 sec

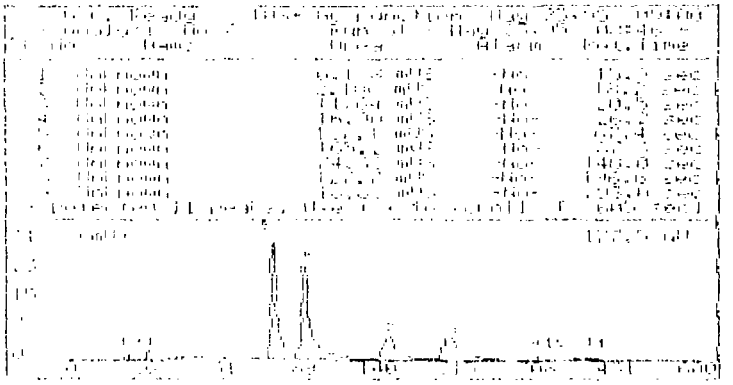

G.C. Ready
Analysis No 4
Run at
Pk No Name Area Alarm Ret.Time
1 Unknown 9.164 mVS -No- 15.7 sec
2 Unknown 21.62 mVS -No- 20.2 sec
3 Unknown 29.20 mVS -No- 26.3 sec
Detected 3 peaks.
600 secs
8412
4200
1778
403
716.5 uV
0
51
85
140
215
300
431
600

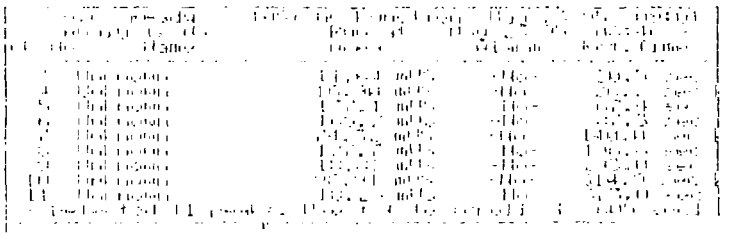


10 ug/l std
250 ul



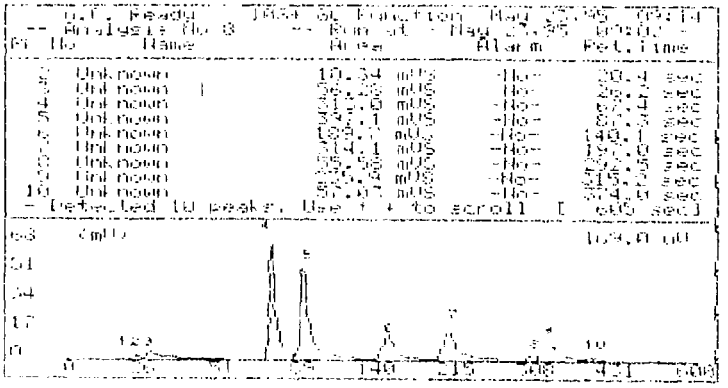
50 ug/l std
100 ul





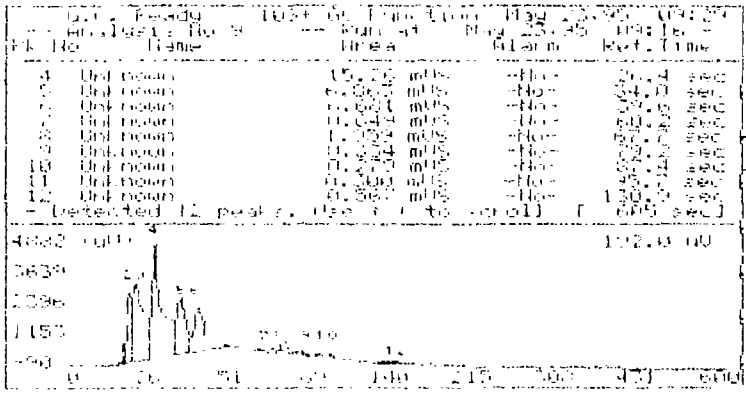
500 ug/l std

50 ml

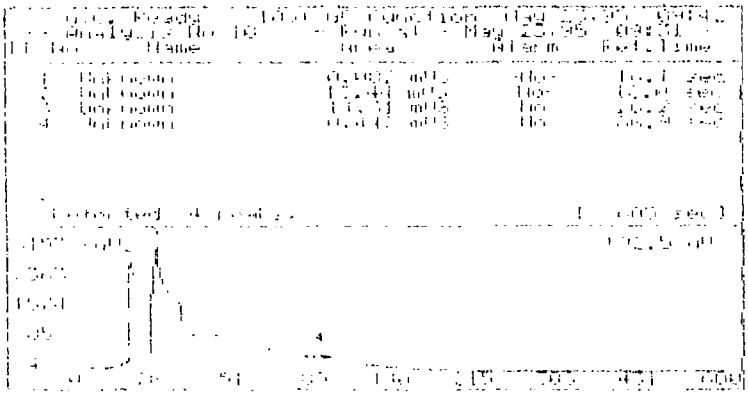


MW31
(Dev. water)

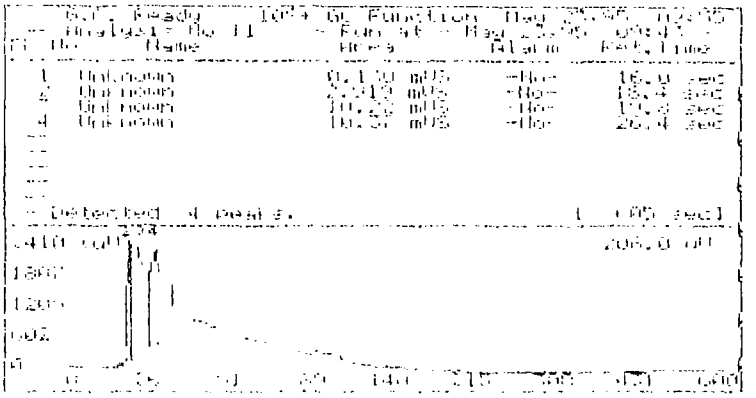
100 ul



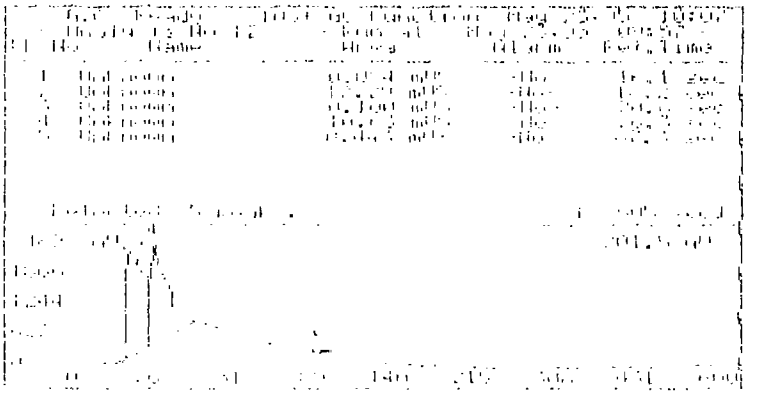
SB7-12-1.5
100 ul
11.2 g



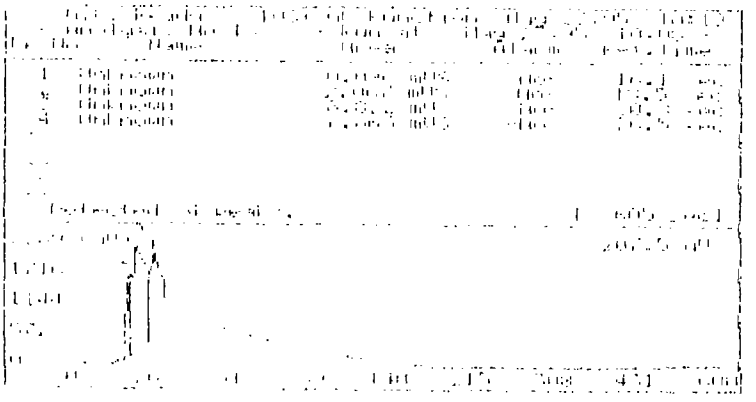
SB7-12-3.5



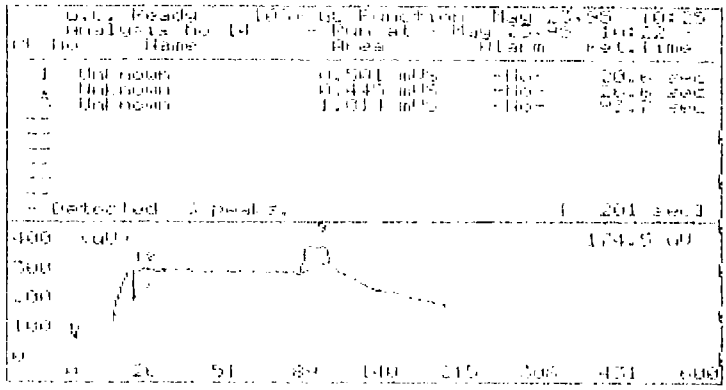
SB7-12-5.5



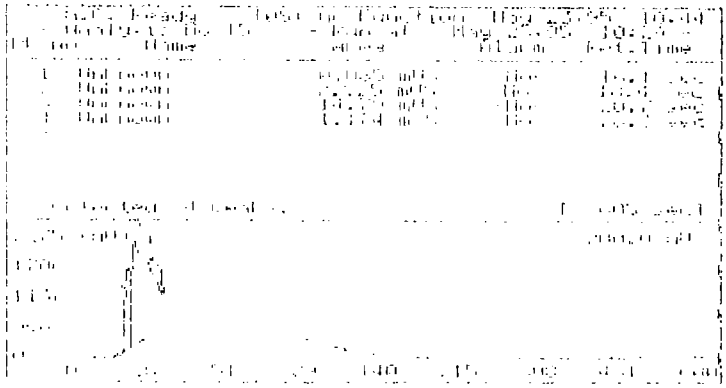
SB7-12-7.5



SB7-12-7.5
Dup



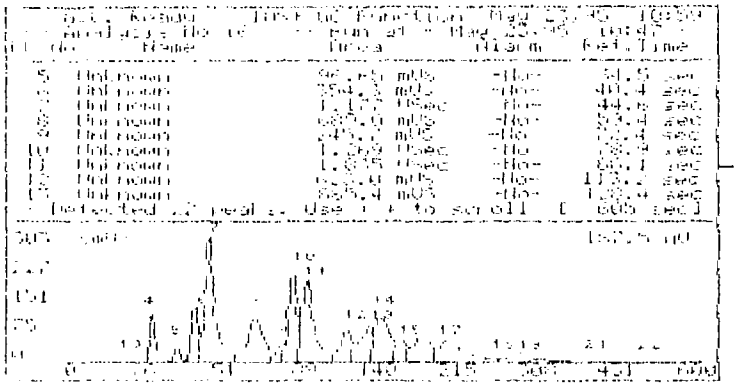
SB7-12-7.5
Dup



SB7-9-1.5

100 ul

10.7g



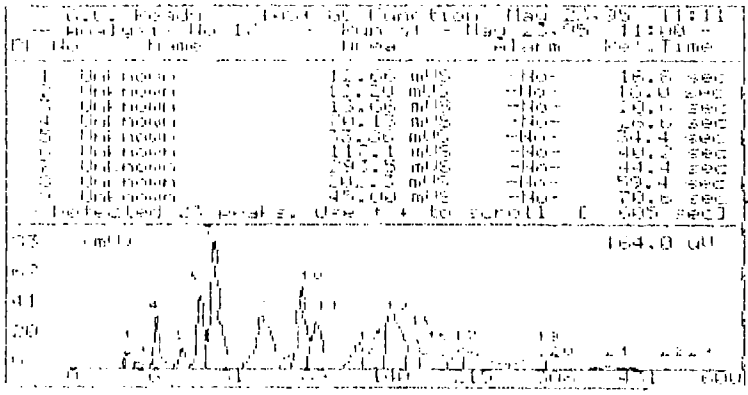
TCE



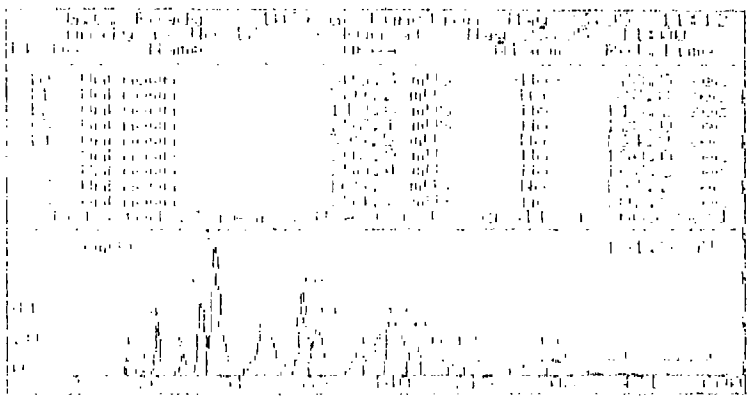
SB7-9-3.5

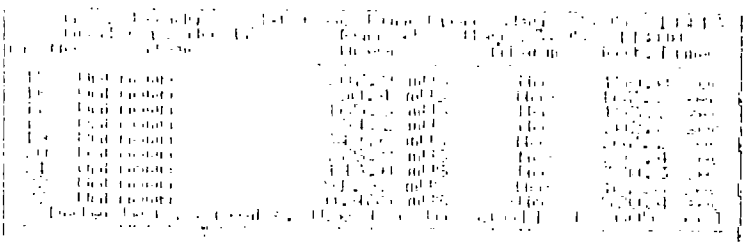
100 ml

11.7g



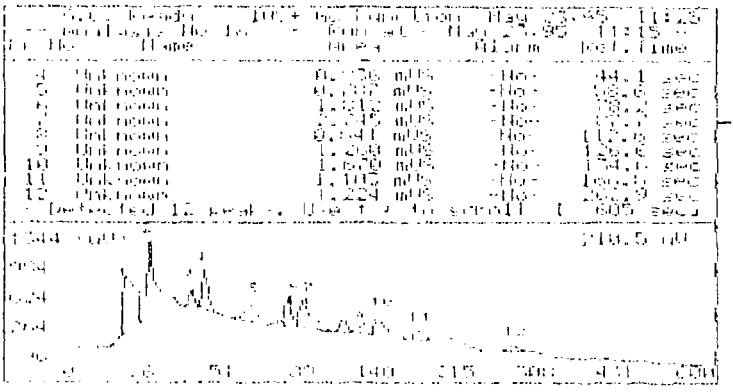
B





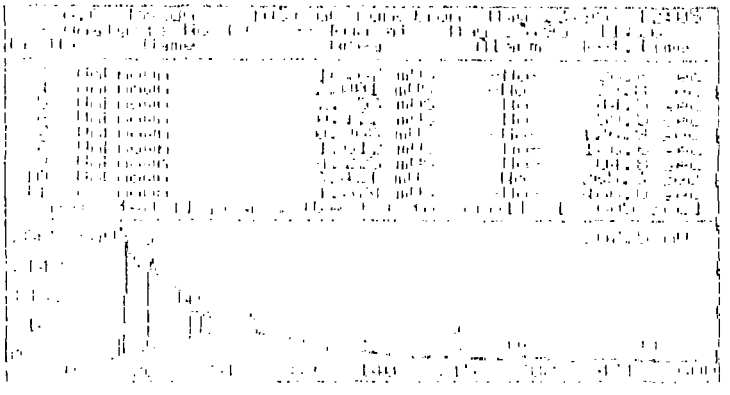
X

SB7-9-5.5
100 ul
12.1g



TCE

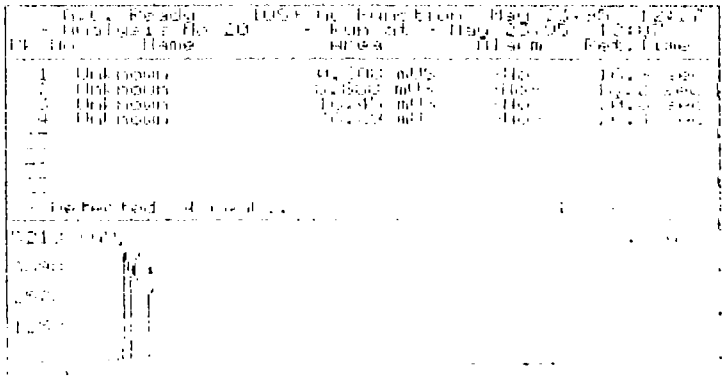
SB7-9-7.5
100 ul
9.9g



SB7-10-05

100 ml

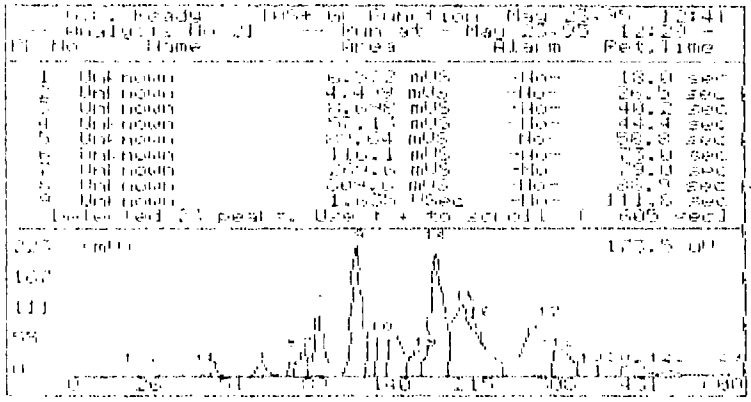
13 4g

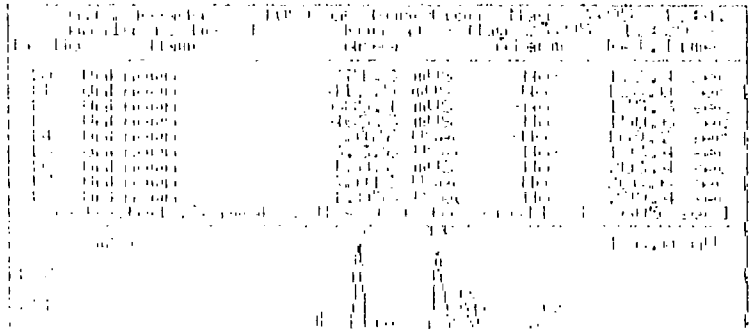


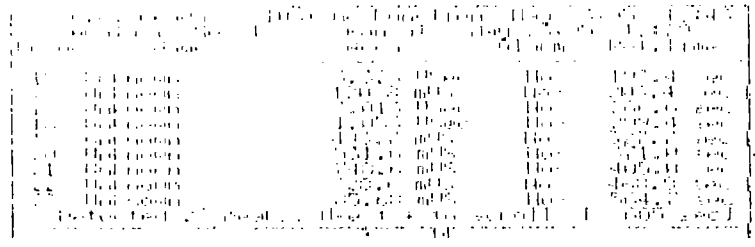
SB7-10-4.0

100 ul

12.3g



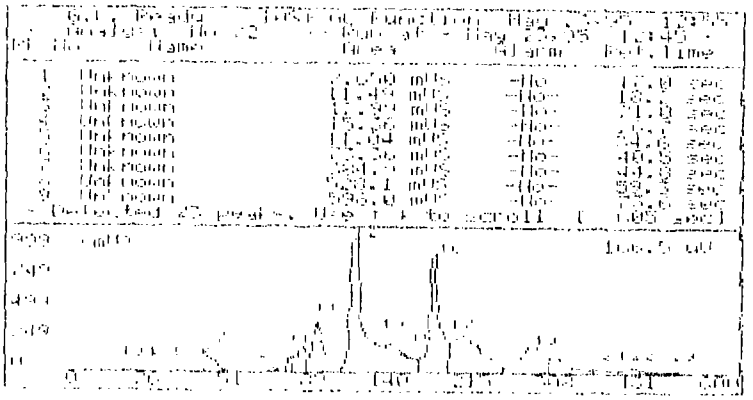


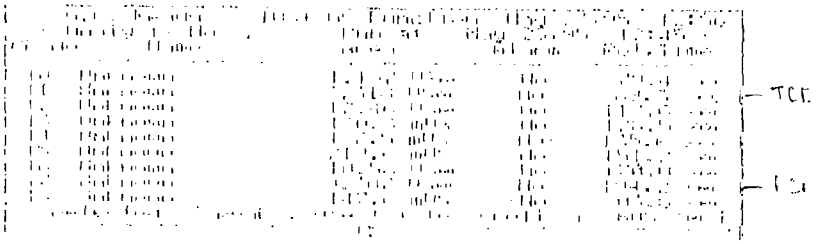


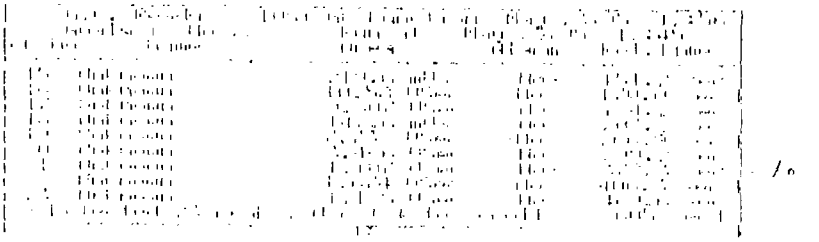
SBT-10_5.0

9.6g

100 uL

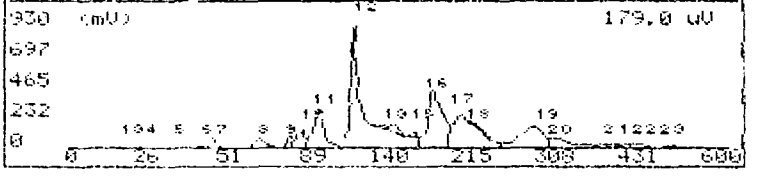






SB7-10-5.0
Dup
100 ml
9.3g

```
  G.C. Ready     105+ GC Function  May 23,95   13:10
 -- Analysis No 23     -- Run at - May 23,95   12:58 -
Pk No      Name              Area          Alarm    Ret.Time
  1   Unknown          2,159 mUS        -No-      17.0 sec
  2   Unknown          10.65 mUS        -No-      18.2 sec
  3   Unknown          13.57 mUS        -No-      21.0 sec
  4   Unknown          15.97 mUS        -No-      26.6 sec
  5   Unknown          8.768 mUS        -No-      34.6 sec
  6   Unknown          45.27 mUS        -No-      40.4 sec
  7   Unknown          24.06 mUS        -No-      44.0 sec
  8   Unknown          226.9 mUS        -No-      58.2 sec
  9   Unknown          387.2 mUS        -No-      73.4 sec
 - Detected 27 peaks. Use ↑ ↓ to scroll  [  605 sec]
```




```
  G.C. Ready     105+ GC Function  May 23,95   13:10
 -- Analysis No 23     -- Run at - May 23,95   12:58 -
Pk No      Name              Area          Alarm    Ret.Time
 10   Unknown          212.4 mUS        -No-      79.3 sec
 11   Unknown          2.150 USec       -No-      89.2 sec   ← TCE
 12   Unknown          9.221 USec       -No-      112.0 sec
 13   Unknown          [illegible] mUS  -No-      [illegible] sec
 14   Unknown          [illegible] mUS  -No-      [illegible] sec
 15   Unknown          156.5 mUS        -No-      150.8 sec
 16   Unknown          [illegible] USec -No-      [illegible] sec
 17   Unknown          [illegible] USec -No-      [illegible] sec   ← PCC
 18   Unknown          213.7 mUS        -No-      200.2 sec
 - Detected 23 peaks. Use ↑ ↓ to scroll  [  605 sec]
```

```
  G.C. Ready     105+ GC Function  May 23,95   13:11
 -- Analysis No 23     -- Run at - May 23,95   12:58 -
Pk No      Name              Area          Alarm    Ret.Time
 15   Unknown          156.5 mUS        -No-      150.8 sec
 16   Unknown          [illegible] USec -No-      [illegible] sec
 17   Unknown          [illegible] USec -No-      [illegible] sec
 18   Unknown          213.7 mUS        -No-      200.2 sec
 19   Unknown          2.457 USec       -No-      [illegible] sec
 20   Unknown          2.505 USec       -No-      [illegible] sec   ← Xo
 21   Unknown          947.6 mUS        -No-      [illegible] sec
 22   Unknown          1.750 USec       -No-      404.6 sec
 23   Unknown          [illegible] mUS  -No-      [illegible] sec
 - Detected 23 peaks. Use ↑ ↓ to scroll  [  605 sec]
```

SB7-10-7.0
100 ul
10.8

G.C. Ready 103+ GC Function May 23,95 13:24
-- Analysis No 24 -- Run at - May 23,95 13:12 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	7.0565	mUS	-No-	50.0	sec
2	Unknown	6.1665	mUS	-No-	73.9	sec
3	Unknown	19.7595	mUS	-No-	78.9	sec
4	Unknown	65.6685	mUS	-No-	80.6	sec
5	Unknown	12.8550	mUS	-No-	111.6	sec
6	Unknown	4.5520	mUS	-No-	136.4	sec
7	Unknown	11.4000	mUS	-No-	150.4	sec
8	Unknown	19.7040	mUS	-No-	164.4	sec
9	Unknown	92.5880	mUS	-No-	256.9	sec
10	Unknown	32.5880	mUS	-No-	266.9	sec

- Detected 10 peaks. Use ↑ ↓ to scroll [605 sec]

TCE

PCE



SBT-9-8.0
100 ul
12.3g

G.C. Ready 103+ GC Function May 23,95 13:36
-- Analysis No 25 -- Run at - May 23,95 13:25 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	4.515	mUS	-No-	18.6	sec
2	Unknown	12.58	mUS	-No-	20.8	sec
3	Unknown	16.61	mUS	-No-	26.7	sec
4	Unknown	7.1565	mUS	-No-	34.6	sec
5	Unknown	8.282	mUS	-No-	40.4	sec
6	Unknown	30.37	mUS	-No-	44.1	sec
7	Unknown	15.92	mUS	-No-	59.5	sec
8	Unknown	4.970	mUS	-No-	72.8	sec
9	Unknown	18.59	mUS	-No-	79.2	sec

- Detected 18 peaks. Use ↑ ↓ to scroll [605 sec]



G.C. Ready 103+ GC Function May 23,95 13:38
-- Analysis No 25 -- Run at - May 23,95 13:25 -

Pk No	Name	Area		Alarm	Ret.Time	
10	Unknown	25.02	mUS	-No-	88.4	sec
11	Unknown	10.96	mUS	-No-	117.7	sec
12	Unknown	15.51	mUS	-No-	129.9	sec
13	Unknown	19.55	mUS	-No-	136.4	sec
14	Unknown	9.435	mUS	-No-	150.6	sec
15	Unknown	23.87	mUS	-No-	159.2	sec
16	Unknown	24.14	mUS	-No-	194.4	sec
17	Unknown	7.256	mUS	-No-	268.0	sec
18	Unknown	4.399	mUS	-No-	301.8	sec

- Detected 18 peaks. Use ↑ ↓ to scroll [605 sec]

TCE

PCE

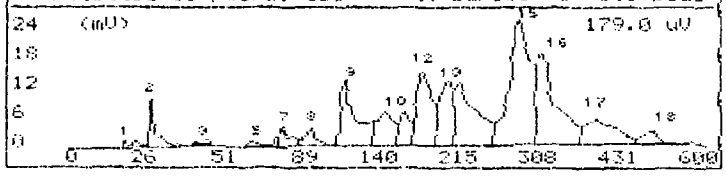
SB7-11-1.5
20 ml
14.7g

G.C. Ready 106+ GC Function May 23,95 15:55
-- Analysis No 26 -- Run at - May 23,95 13:44 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	5.555	mUS	-No-	17.4	sec
2	Unknown	52.777	mUS	-No-	26.7	sec
3	Unknown	8.359	mUS	-No-	46.2	sec
4	Unknown	1.935	mUS	-No-	44.8	sec
5	Unknown	4.384	mUS	-No-	58.2	sec
6	Unknown	3.201	mUS	-No-	69.0	sec
7	Unknown	4.781	mUS	-No-	80.4	sec
8	Unknown	4.561	mUS	-No-	84.6	sec
9	Unknown	142.2	mUS	-No-	114.0	sec

- Detected 18 peaks. Use ↑ ↓ to scroll [600 sec]

B
TCE



G.C. Ready 106+ GC Function May 23,95 15:56
-- Analysis No 26 -- Run at - May 23,95 13:44 -

Pk No	Name	Area		Alarm	Ret.Time	
10	Unknown	87.70	mUS	-No-	136.2	sec
11	Unknown	24.602	mUS	-No-	151.2	sec
12	Unknown	263.2	mUS	-No-	169.2	sec
13	Unknown	200.1	mUS	-No-	194.6	sec
14	Unknown	45.68	mUS	-No-	205.4	sec
15	Unknown	375.4	mUS	-No-	263.4	sec
16	Unknown	511.5	mUS	-No-	301.2	sec
17	Unknown	230.3	mUS	-No-	334.2	sec
18	Unknown	86.61	mUS	-No-	400.6	sec

- Detected 18 peaks. Use ↑ ↓ to scroll [600 sec]

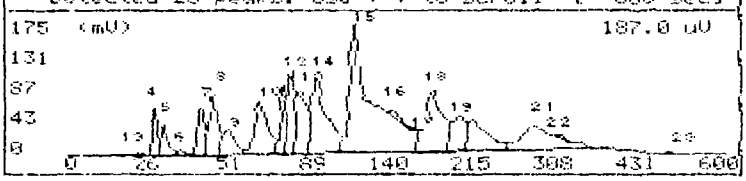
PCE
Xo

SB7-11-3.5
20 ml
10.8 g

G.C. Ready 10S+ GC Function May 23,95 14:08
-- Analysis No 27 -- Run at - May 23,95 13:58 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	1.078 mUS	-No-	16.6 sec
2	Unknown	1.553 mUS	-No-	18.2 sec
3	Unknown	11.48 mUS	-No-	21.6 sec
4	Unknown	108.4 mUS	-No-	26.6 sec
5	Unknown	93.24 mUS	-No-	34.4 sec
6	Unknown	19.81 mUS	-No-	34.8 sec
7	Unknown	166.2 mUS	-No-	41.0 sec
8	Unknown	250.0 mUS	-No-	44.7 sec
9	Unknown	144.3 mUS	-No-	49.3 sec

- Detected 23 peaks. Use ↑ ↓ to scroll [600 sec]



G.C. Ready 10S+ GC Function May 23,95 14:09
-- Analysis No 27 -- Run at - May 23,95 13:58 -

Pk No	Name	Area	Alarm	Ret.Time	
10	Unknown	347.7 mUS	-No-	59.0 sec	
11	Unknown	264.2 mUS	-No-	68.8 sec	← B
12	Unknown	538.8 mUS	-No-	73.4 sec	
13	Unknown	615.4 mUS	-No-	85.6 sec	
14	Unknown	1.144 USec	-No-	89.4 sec	← TCE
15	Unknown	3.057 USec	-No-	112.2 sec	
16	Unknown	52.01 mUS	-No-	126.7 sec	
17	Unknown	13.40 mUS	-No-	150.6 sec	
18	Unknown	1.471 USec	-No-	169.8 sec	

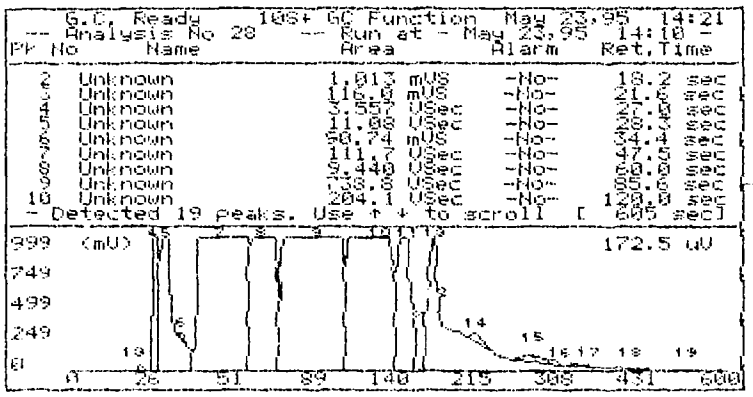
- Detected 23 peaks. Use ↑ ↓ to scroll [600 sec]

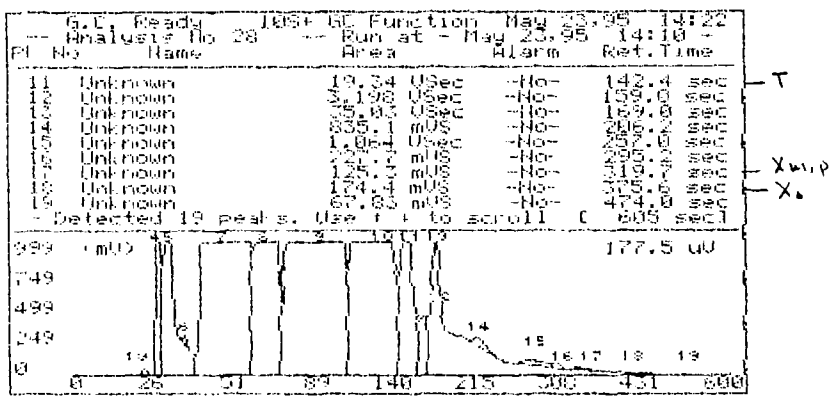
G.C. Ready 10S+ GC Function May 23,95 14:09
-- Analysis No 27 -- Run at - May 23,95 13:58 -

Pk No	Name	Area	Alarm	Ret.Time	
15	Unknown	3.057 USec	-No-	112.2 sec	
16	Unknown	52.01 mUS	-No-	126.7 sec	
17	Unknown	13.40 mUS	-No-	150.6 sec	
18	Unknown	1.471 USec	-No-	169.8 sec	
19	Unknown	698.3 mUS	-No-	192.6 sec	← PCE
20	Unknown	847.4 mUS	-No-	205.2 sec	
21	Unknown	1.684 USec	-No-	268.0 sec	
22	Unknown	222.95 mUS	-No-	298.9 sec	
23	Unknown	36.64 mUS	-No-	470.4 sec	

- Detected 23 peaks. Use ↑ ↓ to scroll [600 sec]

SB7-11-5.5
20ml
12.6g





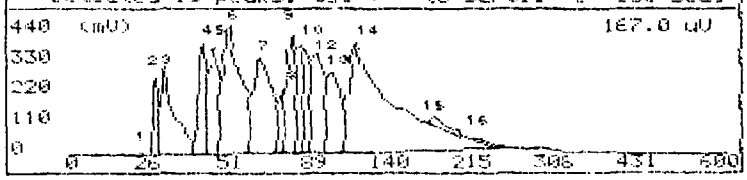
387-11-5.5
5 ul
12.6 g

G.C. Ready 10S+ GC Function May 23,95 14:34
-- Analysis No 29 -- Run at - May 23,95 14:22 -

Pk No	Name	Area		Alarm	Ret.Time	
3	Unknown	1.392	USec	-No-	29.4	sec
4	Unknown	1.102	USec	-No-	41.4	sec
5	Unknown	1.218	USec	-No-	44.5	sec
6	Unknown	2.454	USec	-No-	54.5	sec
7	Unknown	2.355	USec	-No-	64.1	sec
8	Unknown	810.1	mUS	-No-	68.9	sec
9	Unknown	2.083	USec	-No-	73.8	sec
10	Unknown	1.604	USec	-No-	78.1	sec
11	Unknown	1.554	USec	-No-	82.1	sec

- Detected 16 peaks. Use + - to scroll [605 sec]

-B

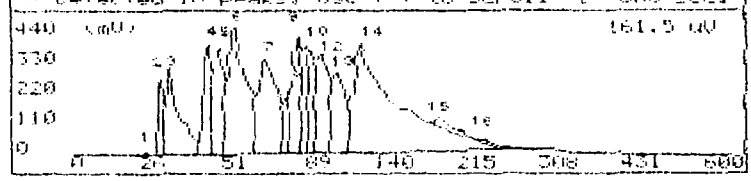


G.C. Ready 10S+ GC Function May 23,95 14:35
-- Analysis No 29 -- Run at - May 23,95 14:22 -

Pk No	Name	Area		Alarm	Ret.Time	
8	Unknown	810.1	mUS	-No-	68.9	sec
9	Unknown	2.083	USec	-No-	73.8	sec
10	Unknown	1.604	USec	-No-	78.1	sec
11	Unknown	1.554	USec	-No-	82.1	sec
12	Unknown	6.785	USec	-No-	89.0	sec
13	Unknown	2.680	USec	-No-	94.4	sec
14	Unknown	13.45	USec	-No-	111.5	sec
15	Unknown	446.3	mUS	-No-	169.4	sec
16	Unknown	89.09	mUS	-No-	206.3	sec

- Detected 16 peaks. Use + - to scroll [605 sec]

-TCE

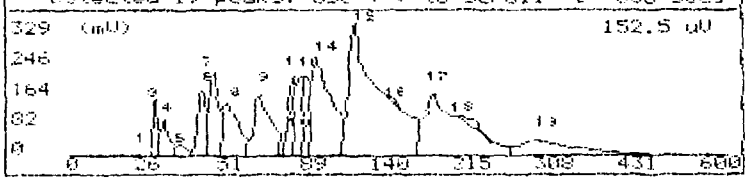


SB7-11-6.5
10 ml
10.4g

G.C. Ready 105+ GC Function May 23,95 14:47
-- Analysis No 30 -- Run at - May 23,95 14:36 -

Pk No	Name	Area	Alarm	Ret.Time
2	Unknown	8.131 mUS	-No-	21.1 sec
3	Unknown	257.9 mUS	-No-	28.2 sec
4	Unknown	267.6 mUS	-No-	29.6 sec
5	Unknown	104.4 mUS	-No-	34.2 sec
6	Unknown	463.4 mUS	-No-	41.0 sec
7	Unknown	278.0 mUS	-No-	44.5 sec
8	Unknown	701.9 mUS	-No-	49.1 sec
9	Unknown	1.003 VSec	-No-	58.9 sec
10	Unknown	181.7 mUS	-No-	68.4 sec

- Detected 19 peaks. Use ↑ ↓ to scroll [605 sec] — B

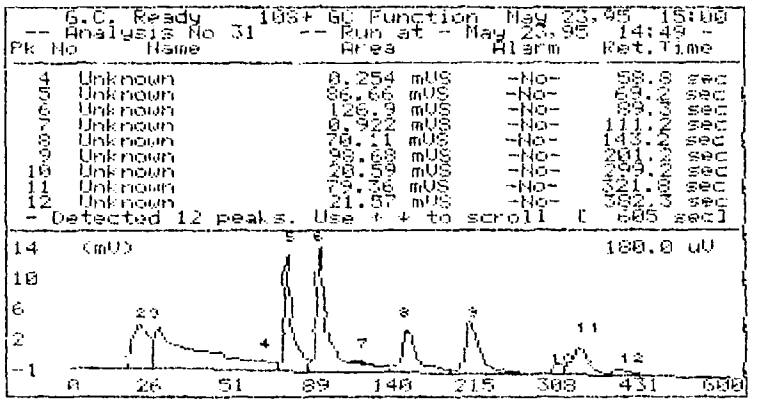


G.C. Ready 105+ GC Function May 23,95 14:48
-- Analysis No 30 -- Run at - May 23,95 14:36 -

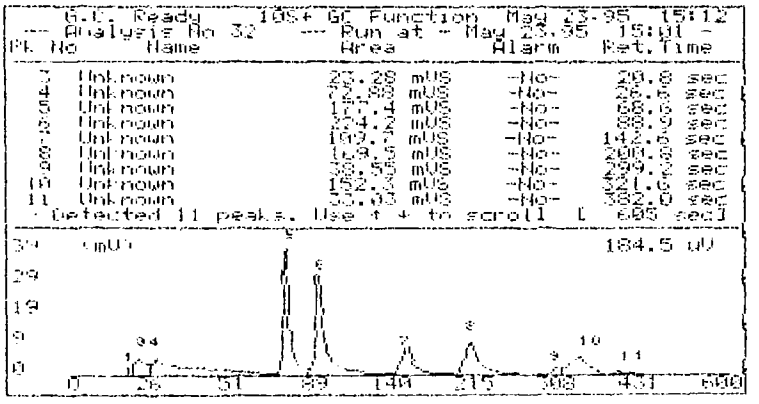
Pk No	Name	Area	Alarm	Ret.Time
11	Unknown	927.0 mUS	-No-	73.4 sec
12	Unknown	980.1 mUS	-No-	78.6 sec
13	Unknown	741.9 mUS	-No-	81.7 sec
14	Unknown	2.456 USec	-No-	92.0 sec
15	Unknown	2.321 USec	-No-	112.1 sec
16	Unknown	955.179 mUS	-No-	134.5 sec
17	Unknown	2.511 USec	-No-	154.4 sec
18	Unknown	857.2 mUS	-No-	172.6 sec
19	Unknown	3.028 USec	-No-	268.5 sec

- Detected 19 peaks. Use ↑ ↓ to scroll [605 sec] — TCE

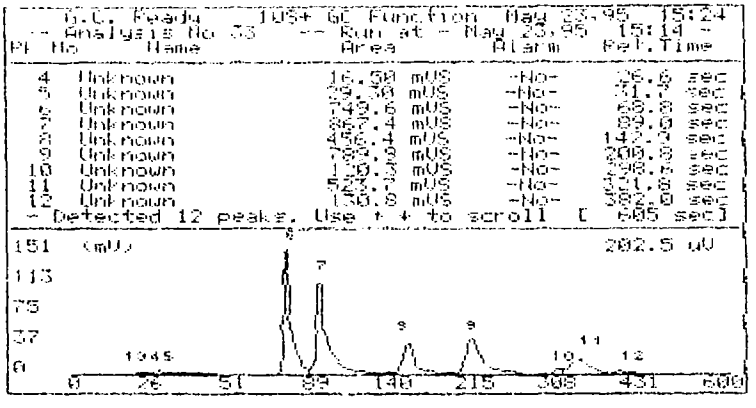
10 ug/l std
250 ml



50 ug/l std
100 ml



500 ug/l std
50 ml



GC Data (5/23/95)

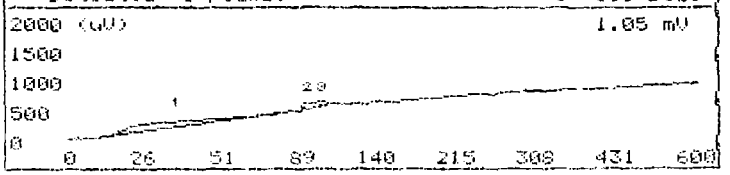
SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
MW31	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.7
SB7-9-1.5	0.0	880.8	0.0	0.0	0.0	0.0	0.0	880.8
SB7-9-3.5	24.5	118.6	0.0	0.0	0.0	0.0	476.9	619.9
SB7-9-5.5	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.2
SB7-9-8.0	0.0	10.4	0.0	13.2	0.0	0.0	0.0	23.7
SB7-10-4.0	0.0	338.1	0.0	0.0	0.0	0.0	1686.3	2024.4
SB7-10-5.0	0.0	1775.2	0.0	6524.1	0.0	0.0	4499.1	12798.4
SB7-10-5.0 D	0.0	1209.5	0.0	4789.5	0.0	0.0	3976.4	9975.3
SB7-10-7.0	0.0	28.8	0.0	98.0	0.0	0.0	0.0	126.9
SB7-11-1.5	14.6	48.2	0.0	412.2	0.0	0.0	3725.2	4200.1
SB7-11-3.5	954.5	2720.2	0.0	2144.4	0.0	0.0	0.0	5819.1
SB7-11-5.5	8177.3	22688.5	0.0	0.0	0.0	0.0	0.0	30865.8
SB7-11-5.5	0.0	0.0	0.0	0.0	0.0	395.9	2700.2	3096.1
SB7-11-6.6	6133.1	17275.1	0.0	0.0	0.0	0.0	0.0	23408.2

5/24/95

Analyzing 10S+ GC Function May 24,95 07:30
-- Analysis No 1 -- Run at - May 24,95 07:20 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	4.025 mVS	-No-	33.0 sec
2	Unknown	0.146 mVS	-No-	87.8 sec
3	Unknown	1.028 mVS	-No-	99.7 sec

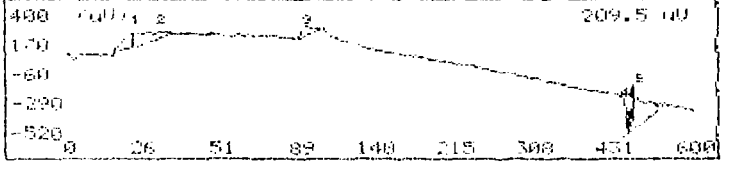
- Detected 3 peaks. [588 sec]



G.C. Ready 10S+ GC Function May 24,95 07:48
-- Analysis No 2 -- Run at - May 24,95 07:38 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.409 mVS	-No-	21.3 sec
2	Unknown	0.659 mVS	-No-	93.3 sec
3	Unknown	0.472 mVS	-No-	209.4 sec
4	Unknown	1.211 mVS	-No-	436.4 sec
5	Unknown	7.305 mVS	-No-	445.6 sec

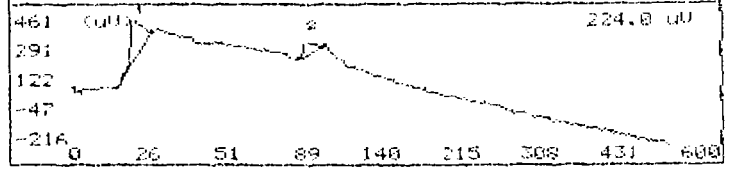
- Detected 5 peaks. [576 sec]

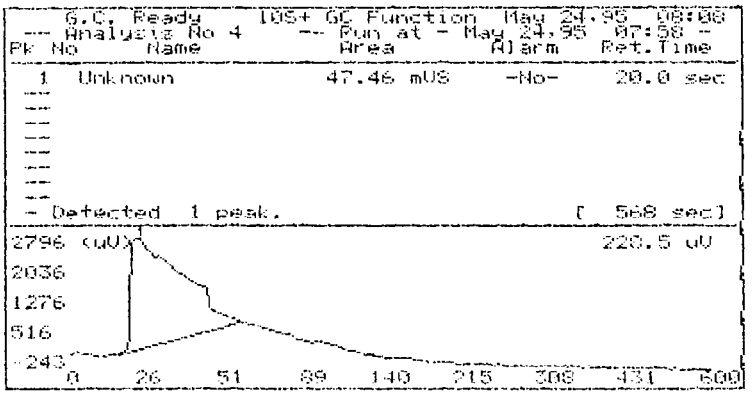


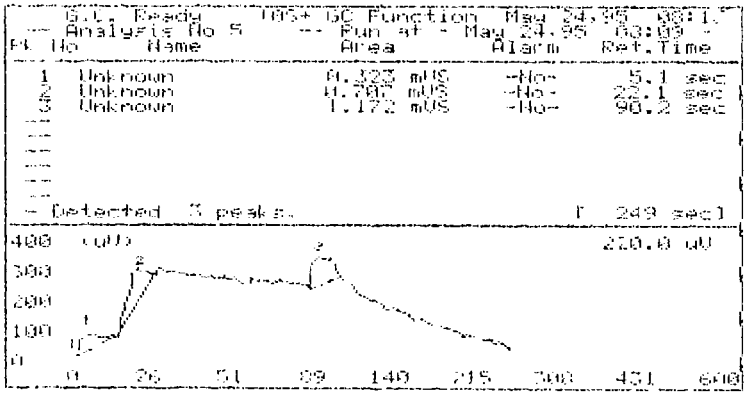
G.C. Ready 10S+ GC Function May 24,95 07:58
-- Analysis No 3 -- Run at - May 24,95 07:49 -

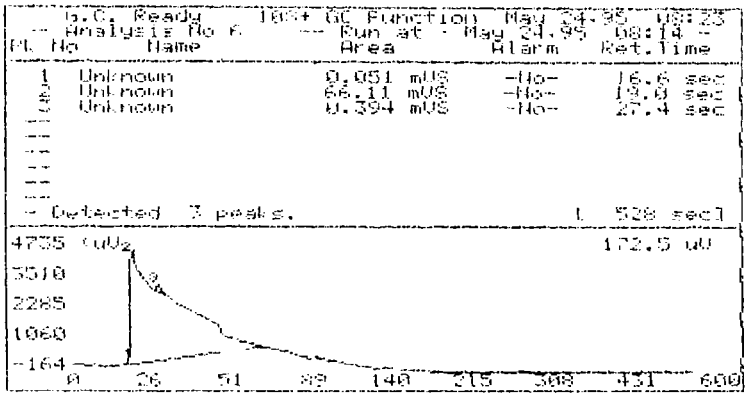
Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.936 mVS	-No-	19.5 sec
2	Unknown	0.531 mVS	-No-	86.9 sec

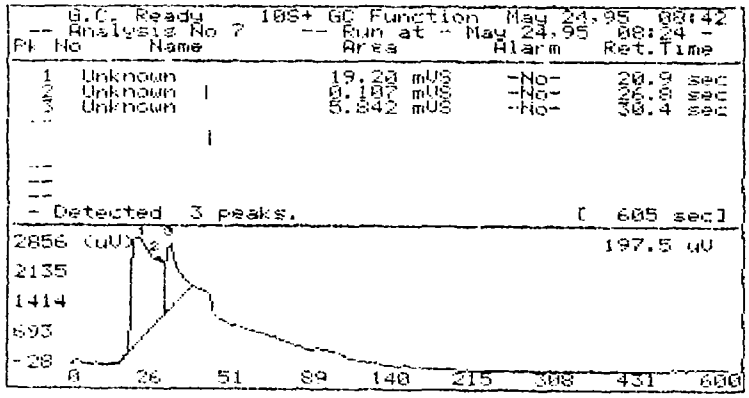
- Detected 2 peaks. [517 sec]

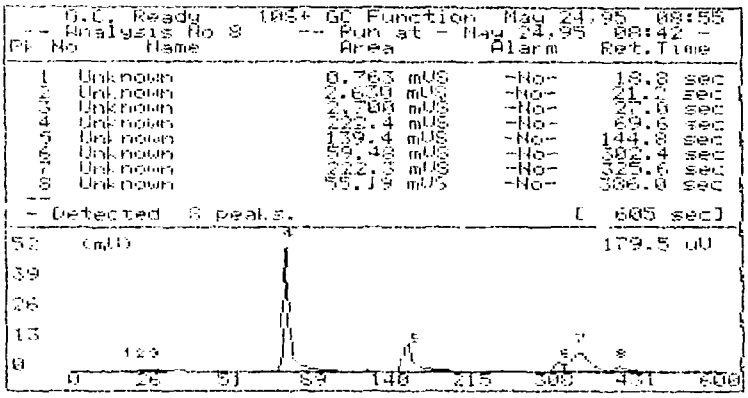


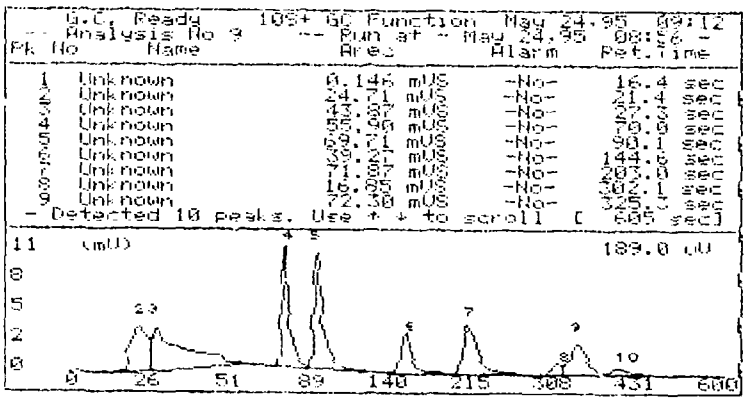

G.C. Ready 105+ GC Function May 24,95 08:08
--- Analysis No 4 --- Run at - May 24,95 07:50 -
Pk No Name Area Alarm Ret.Time
1 Unknown 47.46 mUS -No- 20.0 sec
- Detected 1 peak. [568 sec]
2796 (uV)
2036
1276
516
-243
220.5 uV
0 26 51 89 140 215 308 431 600

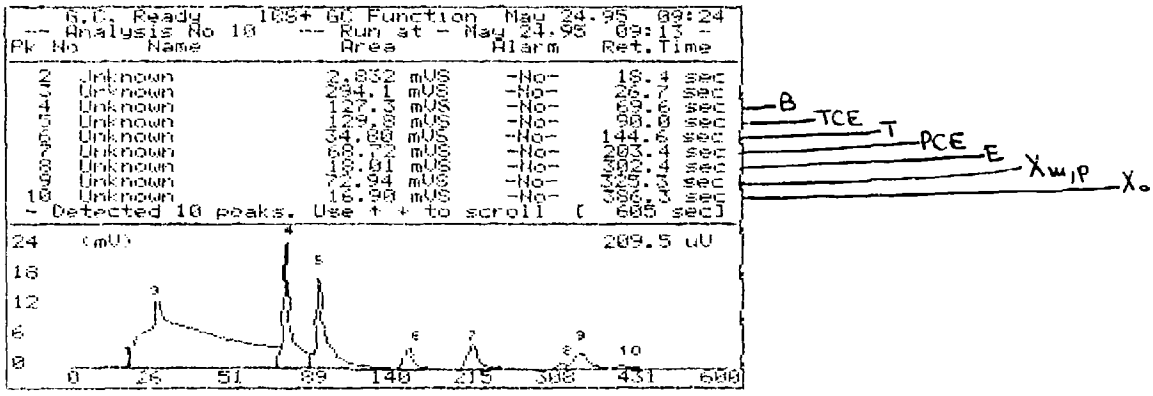

G.C. Ready 105+ GC Function May 24,95 08:1.
--- Analysis No 5 --- Run at - May 24,95 08:09 -
Pk No Name Area Alarm Ret.Time
1 Unknown 0.323 mUS -No- 5.1 sec
2 Unknown 0.707 mUS -No- 22.1 sec
3 Unknown 1.172 mUS -No- 90.2 sec
- Detected 3 peaks. [249 sec]
400 (uV)
300
200
100
0
220.0 uV
0 26 51 89 140 215 308 431 600

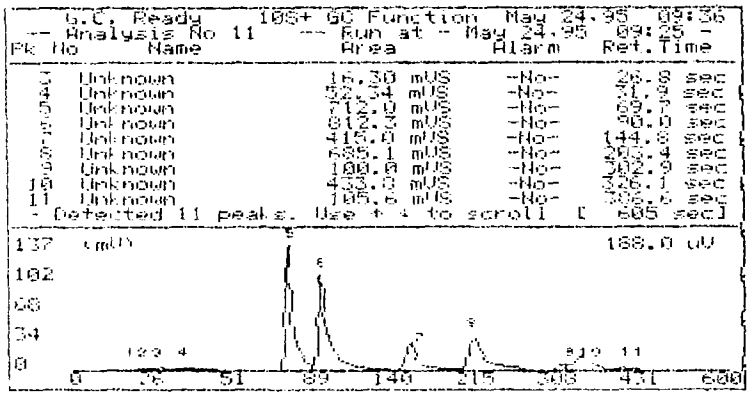

G.C. Ready 105+ GC Function May 24,95 08:23
--- Analysis No 6 --- Run at - May 24,95 08:14 -
Pk No Name Area Alarm Ret.Time
1 Unknown 0.051 mUS -No- 16.6 sec
2 Unknown 66.11 mUS -No- 19.0 sec
3 Unknown 0.394 mUS -No- 27.4 sec
- Detected 3 peaks. [528 sec]
4735 (uV)
3510
2285
1060
-164
172.5 uV
0 26 51 89 140 215 308 431 600


G.C. Ready 100+ GC Function May 24,95 08:42
-- Analysis No 7 -- Run at - May 24,95 08:24 -
Pk No Name Area Alarm Ret.Time
1 Unknown 19.20 mUS -No- 20.9 sec
2 Unknown 0.107 mUS -No- 26.8 sec
3 Unknown 5.842 mUS -No- 30.4 sec
- Detected 3 peaks. [605 sec]
2856 (uV)
197.5 uV
2135
1414
693
-28
0 26 51 89 140 215 308 431 600


G.C. Ready 100+ GC Function May 24,95 08:55
-- Analysis No 8 -- Run at - May 24,95 08:42 -
Pk No Name Area Alarm Ret.Time
1 Unknown 0.763 mUS -No- 18.8 sec
2 Unknown 2.630 mUS -No- 21.4 sec
3 Unknown 4.700 mUS -No- 24.0 sec
4 Unknown 59.4 mUS -No- 89.6 sec
5 Unknown 139.4 mUS -No- 144.8 sec
6 Unknown 30.4 mUS -No- 302.4 sec
7 Unknown 25.5 mUS -No- 325.5 sec
8 Unknown 9.19 mUS -No- 386.0 sec
- Detected 8 peaks. [605 sec]
52 (mU)
179.5 uV
39
26
13
0
0 26 51 89 140 215 308 431 600


G.C. Ready 100+ GC Function May 24,95 09:12
-- Analysis No 9 -- Run at - May 24,95 08:56 -
Pk No Name Area Alarm Ret.Time
1 Unknown 0.146 mUS -No- 16.4 sec
2 Unknown 44.71 mUS -No- 21.4 sec
3 Unknown 4.607 mUS -No- 23.3 sec
4 Unknown 556.0 mUS -No- 70.0 sec
5 Unknown 949.7 mUS -No- 90.1 sec
6 Unknown 30.71 mUS -No- 144.6 sec
7 Unknown 71.85 mUS -No- 203.0 sec
8 Unknown 16.05 mUS -No- 302.1 sec
9 Unknown 22.30 mUS -No- 325.5 sec
- Detected 10 peaks. Use ↑ ↓ to scroll [605 sec]
11 (mU)
189.0 uV
8
5
2
0
0 26 51 89 140 215 308 431 600

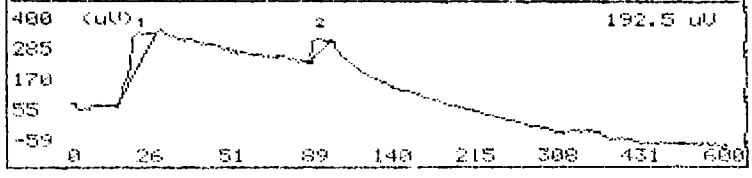

G.C. Ready 10S+ GC Function May 24.95 09:24
-- Analysis No 10 -- Run at - May 24.98 09:13 -
Pk No Name Area Alarm Ret.Time
1 Unknown 2,832 mUS -No- 18.4 sec
2 Unknown 284.1 mUS -No- 26.7 sec
3 Unknown 1327.4 mUS -No- 69.6 sec
4 Unknown 4494.8 mUS -No- 90.0 sec
5 Unknown 644.00 mUS -No- 144.6 sec
6 Unknown 658.12 mUS -No- 203.4 sec
7 Unknown 158.01 mUS -No- 302.9 sec
8 Unknown 726.94 mUS -No- 326.1 sec
9 Unknown 16.90 mUS -No- 386.6 sec
10 Unknown
- Detected 10 peaks. Use ↑ ↓ to scroll [605 sec]
24 (mU)
209.5 uU
16
12
8
0
0 26 51 89 140 215 308 431 600
B
TCE
T
PCE
E
Xw,P
X.


G.C. Ready 10S+ GC Function May 24.95 09:36
-- Analysis No 11 -- Run at - May 24.95 09:25 -
Pk No Name Area Alarm Ret.Time
1 Unknown 16.30 mUS -No- 26.8 sec
2 Unknown 32.54 mUS -No- 31.9 sec
3 Unknown 714.0 mUS -No- 69.5 sec
4 Unknown 812.3 mUS -No- 90.0 sec
5 Unknown 410.0 mUS -No- 144.8 sec
6 Unknown 685.1 mUS -No- 203.4 sec
7 Unknown 100.0 mUS -No- 302.9 sec
8 Unknown 433.0 mUS -No- 326.1 sec
9 Unknown 105.6 mUS -No- 386.6 sec
10 Unknown
11 Unknown
- Detected 11 peaks. Use ↑ ↓ to scroll [605 sec]
137 (mU)
188.0 uU
102
68
34
0
0 26 51 89 140 215 308 431 600

G.C. Ready 10S+ GC Function May 24,95 09:46
-- Analysis No 12 -- Run at - May 24,95 09:26 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.607 mUS	-No-	20.8 sec
2	Unknown	3.481 mUS	-No-	89.3 sec

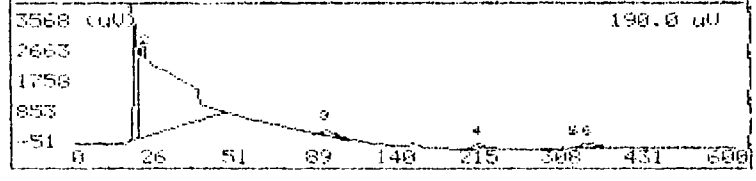
- Detected 2 peaks. [595 sec]

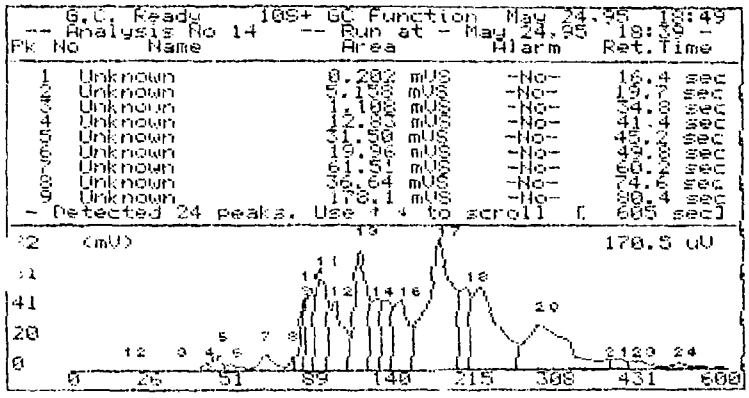


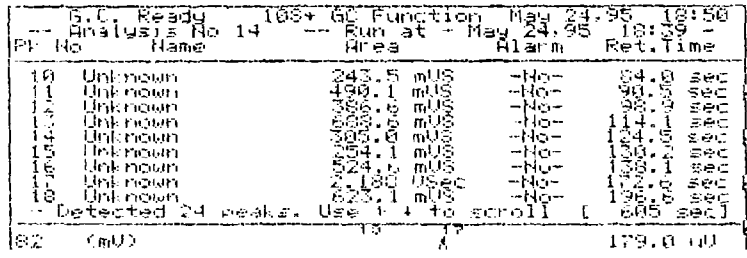
G.C. Ready 10S+ GC Function May 24,95 10:27
-- Analysis No 13 -- Run at - May 24,95 09:47 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	6.122 mUS	-No-	18.6 sec
2	Unknown	29.206 mUS	-No-	71.3 sec
3	Unknown	1.413 mUS	-No-	89.3 sec
4	Unknown	1.549 mUS	-No-	204.1 sec
5	Unknown	0.261 mUS	-No-	401.3 sec
6	Unknown	2.172 mUS	-No-	529.6 sec

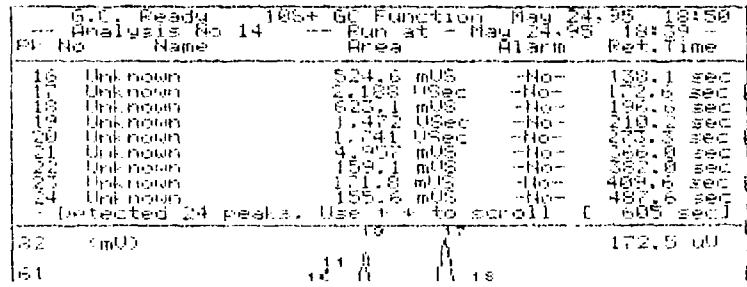
- Detected 6 peaks. [605 sec]




G.C. Ready 10S+ GC Function May 24,95 10:49
-- Analysis No 14 -- Run at - May 24,95 10:49 -
Pk No Name Area Alarm Ret.Time
1 Unknown 0.280 mUS -No- 16.4 sec
2 Unknown 5.138 mUS -No- 19.74 sec
3 Unknown 1,102 mUS -No- 34.0 sec
4 Unknown 41.500 mUS -No- 441.4 sec
5 Unknown 41.500 mUS -No- 445.2 sec
6 Unknown 10.6 mUS -No- 449.2 sec
7 Unknown 61.550 mUS -No- 560.2 sec
8 Unknown 36.643 mUS -No- 574.0 sec
9 Unknown 170.1 mUS -No- 600.4 sec
- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]
82 (mU) 170.5 uU
41
20
0
0 26 51 89 140 215 308 431 600


G.C. Ready 10S+ GC Function May 24,95 10:50
-- Analysis No 14 -- Run at - May 24,95 10:49 -
Pk No Name Area Alarm Ret.Time
10 Unknown 243.5 mUS -No- 604.0 sec
11 Unknown 490.1 mUS -No- 630.0 sec
12 Unknown 3366.9 mUS -No- 638.2 sec
13 Unknown 3003.0 mUS -No- 1144.4 sec
14 Unknown 3003.0 mUS -No- 1144.4 sec
15 Unknown 524.1 mUS -No- 1164.2 sec
16 Unknown 524.6 mUS -No- 1190.1 sec
17 Unknown 2,138 USec -No- 1752.6 sec
18 Unknown 625.1 mUS -No- 1961.6 sec
- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]
82 (mU) 179.0 uU

TCE

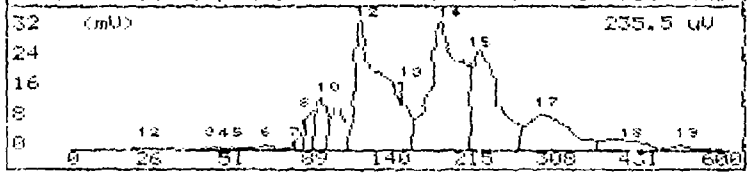

G.C. Ready 10S+ GC Function May 24,95 10:50
-- Analysis No 14 -- Run at - May 24,95 10:49 -
Pk No Name Area Alarm Ret.Time
16 Unknown 524.6 mUS -No- 1190.1 sec
17 Unknown 2,138 USec -No- 1752.6 sec
18 Unknown 625.1 mUS -No- 1961.6 sec
19 Unknown 1,472 USec -No- 2104.6 sec
20 Unknown 1,741 USec -No- 2744.6 sec
21 Unknown 4,907 mUS -No- 3000.0 sec
22 Unknown 159.1 mUS -No- 3000.0 sec
23 Unknown 171.6 mUS -No- 4004.6 sec
24 Unknown 155.6 mUS -No- 4007.6 sec
- Detected 24 peaks. Use ↑ ↓ to scroll [605 sec]
82 (mU) 172.5 uU
41

Xo

S.C. Ready GS+ GC Function May 24,95 19:01
-- Analysis No 15 -- Run at - May 24,95 18:51 -

Pk No	Name	Area	Alarm	Ret.Time
2	Unknown	0.018 mUS	-No-	26.4 sec
3	Unknown	1.169 mUS	-No-	41.4 sec
4	Unknown	2.717 mUS	-No-	45.1 sec
5	Unknown	2.083 mUS	-No-	48.9 sec
6	Unknown	10.709 mUS	-No-	60.4 sec
7	Unknown	3.673 mUS	-No-	64.2 sec
8	Unknown	488.08 mUS	-No-	68.4 sec
9	Unknown	488.69 mUS	-No-	84.1 sec
10	Unknown	96.45 mUS	-No-	90.0 sec

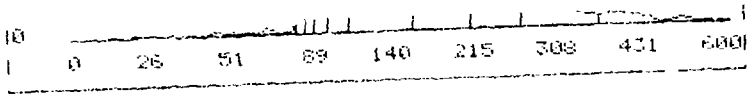
- Detected 19 peaks. Use ↑ ↓ to scroll [600 sec]



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S.C. Ready 10+ GC Function May 24,95 19:03
-- Analysis No 15 -- Run at - May 24,95 18:51 -

Pk No	Name	Area	Alarm	Ret.Time
11	Unknown	104.3 mUS	-No-	99.7 sec
12	Unknown	636.4 mUS	-No-	114.7 sec
13	Unknown	13.31 mUS	-No-	138.0 sec
14	Unknown	1.062 USec	-No-	172.0 sec
15	Unknown	5.257 mUS	-No-	196.6 sec
16	Unknown	20.85 mUS	-No-	211.2 sec
17	Unknown	344.6 mUS	-No-	274.4 sec
18	Unknown	135.6 mUS	-No-	382.6 sec
19	Unknown	57.49 mUS	-No-	488.0 sec

- Detected 19 peaks. Use ↑ ↓ to scroll [605 sec]

12 14

GC Data (5/24/95)

SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
SB14-3-5.5	0.0	2696.5	0.0	0.0	0.0	0.0	0.0	2696.5
SB14-3-7.5	0.0	681.7	0.0	0.0	0.0	0.0	0.0	681.7

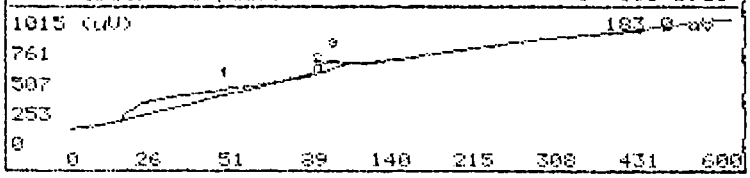
5/25/95

Machine Blank

G.C. Ready 105+ GC Function May 25,95 11:36
-- Analysis No 1 -- Run at - May 25,95 10:52 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	4.335 mVS	-No-	46.7 sec
2	Unknown	0.358 mVS	-No-	91.3 sec
3	Unknown	0.719 mVS	-No-	99.8 sec

- Detected 3 peaks. [605 sec]

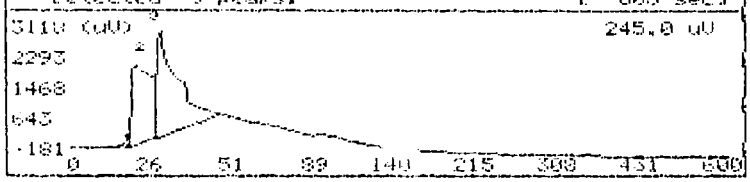


Syringe Blank 250B

G.C. Ready 105+ GC Function May 25,95 11:48
-- Analysis No 2 -- Run at - May 25,95 11:47 -

Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.115 mVS	-No-	17.0 sec
2	Unknown	1.348 mVS	-No-	19.4 sec
3	Unknown	18.58 mVS	-No-	27.6 sec

- Detected 3 peaks. [605 sec]

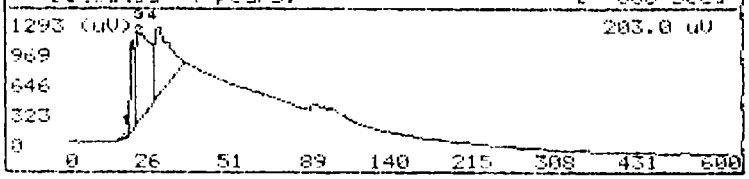


Method Blank 250B

G.C. Ready 105+ GC Function May 25,95 12:36
-- Analysis No 3 -- Run at - May 25,95 11:49 -

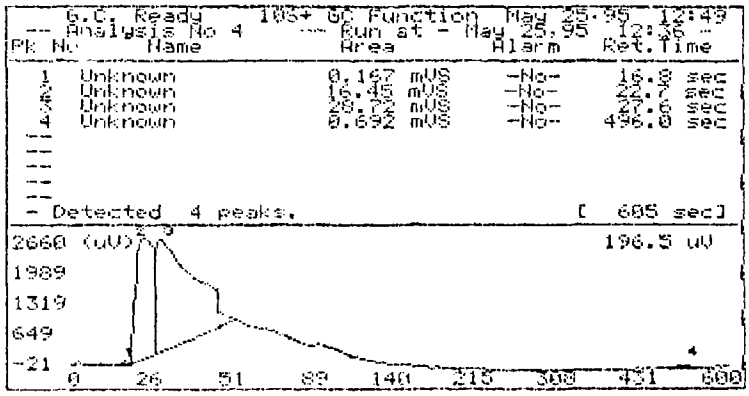
Pk No	Name	Area	Alarm	Ret.Time
1	Unknown	0.064 mVS	-No-	17.0 sec
2	Unknown	1.541 mVS	-No-	19.4 sec
3	Unknown	4.253 mVS	-No-	21.8 sec
4	Unknown	3.196 mVS	-No-	27.4 sec

- Detected 4 peaks. [605 sec]



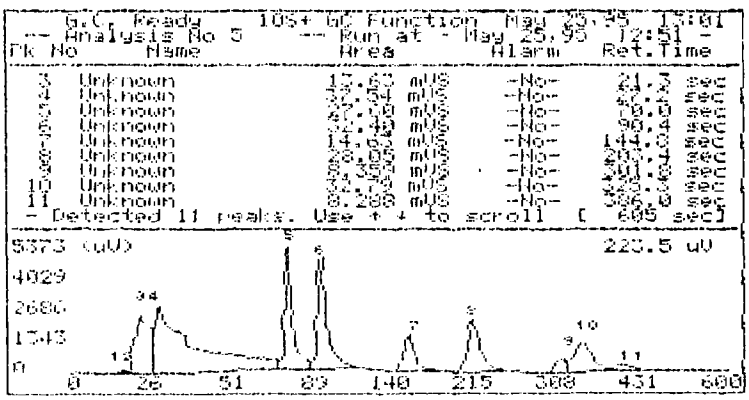
Syring Blank

250 A

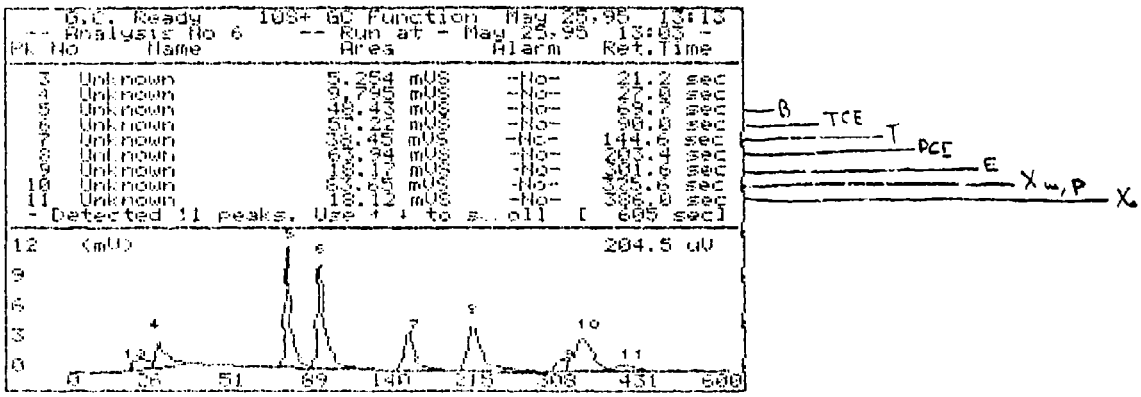


10 mg/l std

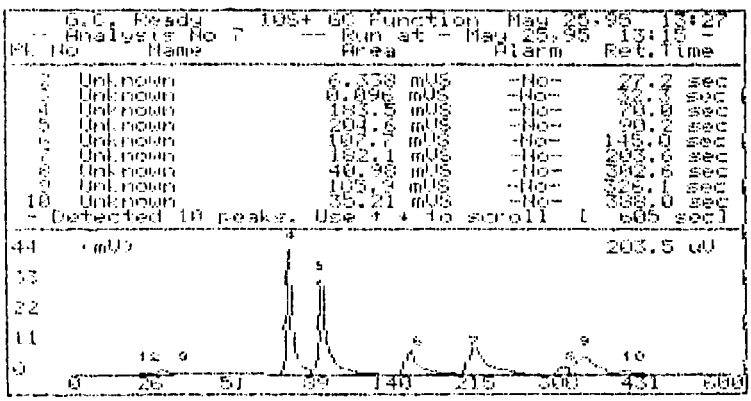
250 ug



50 ug/l
100 ml



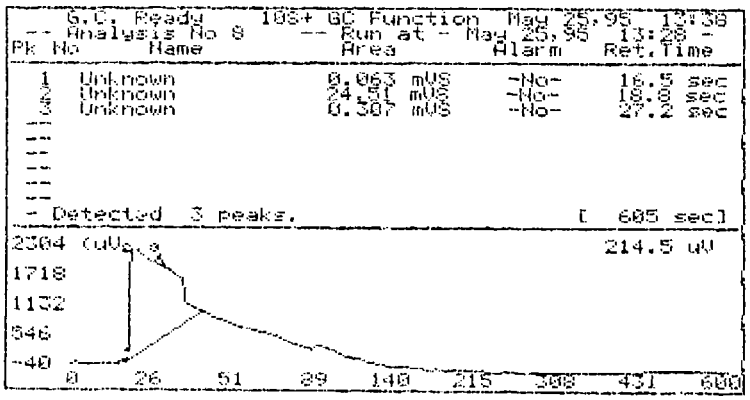
500 ug/l
50 ml



SB14-2-3.0

100 ml

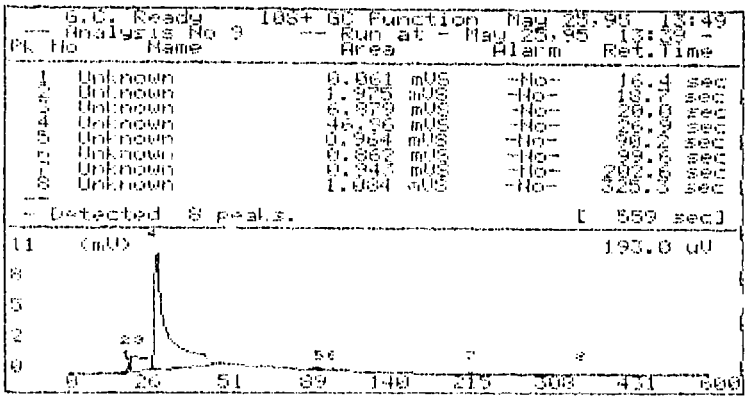
9.9 g



SB14-2-5.5

100 ml

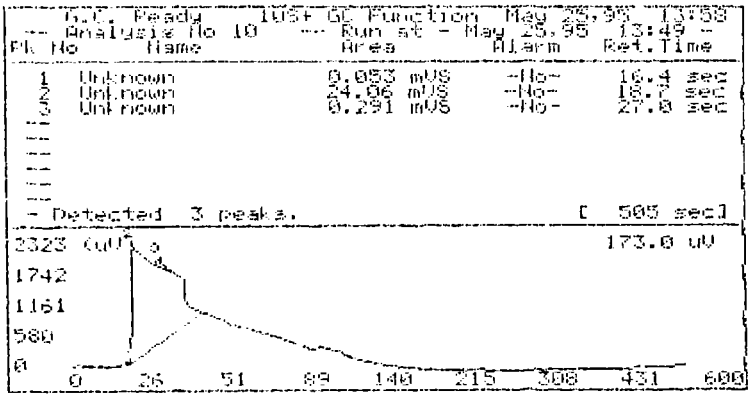
13.7 g



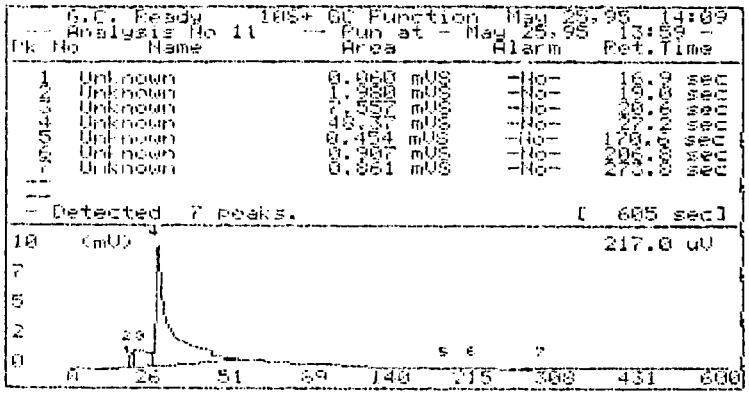
SB14-2-5.5

100 ml

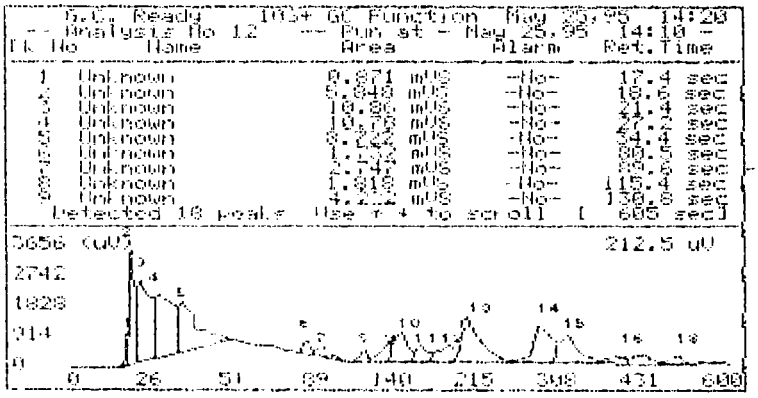
13.7 g



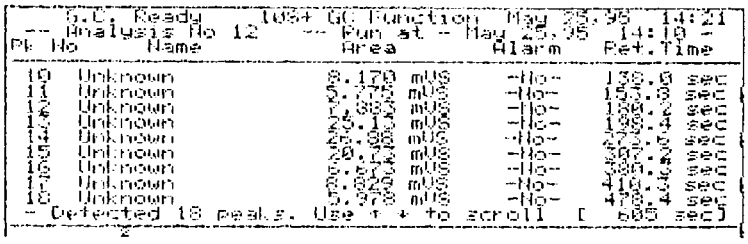
SB14-2-7.5
100 ul
11.6 g



SB14-1-3.5
100 ul
10.4 g



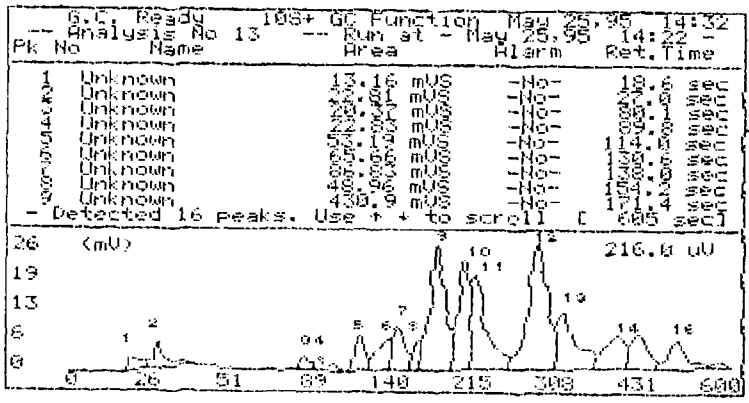
TCE



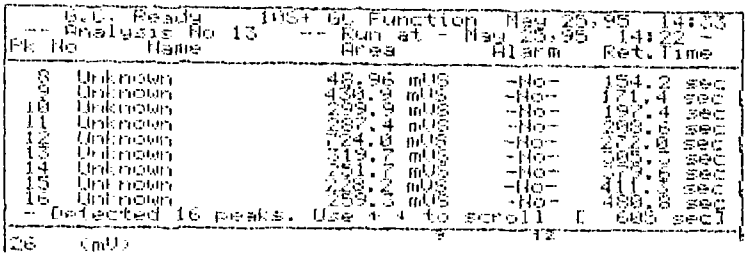
SB14-1-4.0

100 ul

13.1



TCE

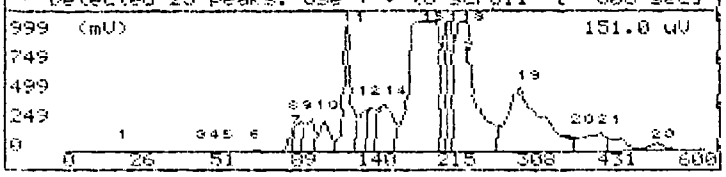


SB14-1-6.0
100 ul
14.8g

G.C. Ready 105+ GC Function May 25,95 14:45
-- Analysis No 14 -- Run at - May 25,95 14:34 -

Pk No	Name	Area		Alarm	Ret.Time	
1	Unknown	11.31	mUS	-No-	16.9	sec
2	Unknown	2.765	mUS	-No-	19.6	sec
3	Unknown	5.151	mUS	-No-	41.6	sec
4	Unknown	14.57	mUS	-No-	45.4	sec
5	Unknown	9.547	mUS	-No-	50.2	sec
6	Unknown	97.06	mUS	-No-	60.6	sec
7	Unknown	90.59	mUS	-No-	80.4	sec
8	Unknown	1.436	USec	-No-	84.2	sec
9	Unknown	1.789	USec	-No-	90.6	sec

- Detected 23 peaks. Use + + to scroll [600 sec]



G.C. Ready 105+ GC Function May 25,95 14:46
-- Analysis No 14 -- Run at - May 25,95 14:34 -

Pk No	Name	Area		Alarm	Ret.Time	
10	Unknown	1.939	USec	-No-	99.4	sec
11	Unknown	2.773	USec	-No-	114.4	sec
12	Unknown	2.168	USec	-No-	120.8	sec
13	Unknown	2.111	USec	-No-	130.4	sec
14	Unknown	4.195	USec	-No-	136.4	sec
15	Unknown	61.52	USec	-No-	173.6	sec
16	Unknown	7.306	USec	-No-	196.6	sec
17	Unknown	5.662	USec	-No-	202.2	sec
18	Unknown	32.97	USec	-No-	210.6	sec

- Detected 23 peaks. Use + + to scroll [600 sec]

G.C. Ready 105+ GC Function May 25,95 14:47
-- Analysis No 14 -- Run at - May 25,95 14:34 -

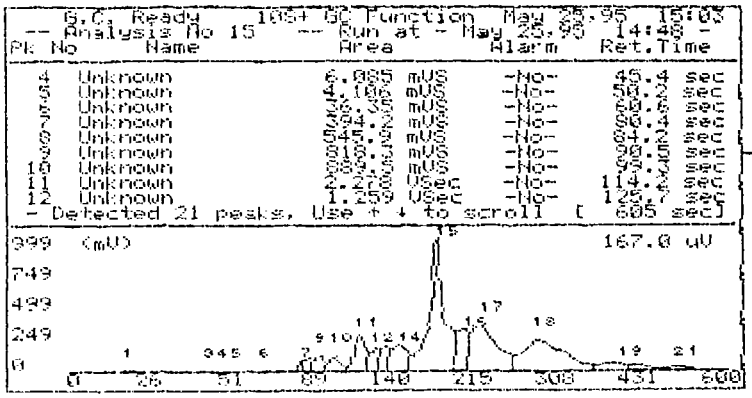
Pk No	Name	Area		Alarm	Ret.Time	
19	Unknown	61.52	USec	-No-	173.6	sec
16	Unknown	7.306	USec	-No-	196.6	sec
17	Unknown	5.662	USec	-No-	202.2	sec
18	Unknown	32.97	USec	-No-	210.6	sec
19	Unknown	25.43	USec	-No-	222.2	sec
20	Unknown	98.12	mUS	-No-	233.0	sec
21	Unknown	5.103	USec	-No-	301.6	sec
22	Unknown	3.193	USec	-No-	409.0	sec
23	Unknown	2.540	USec	-No-	467.2	sec

- Detected 23 peaks. Use + + to scroll [600 sec]

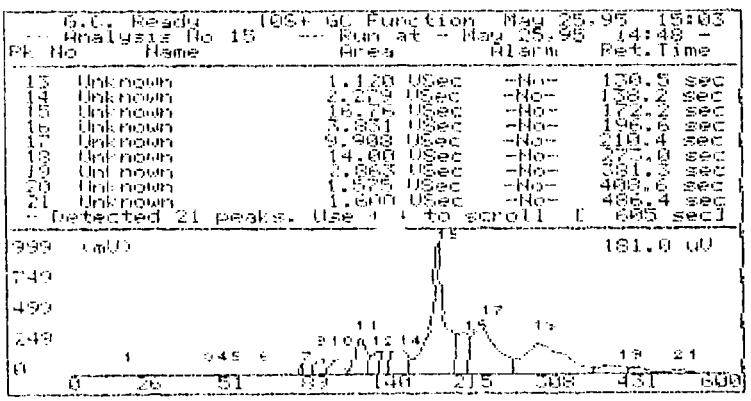
SB14-1-6.0

50 ul

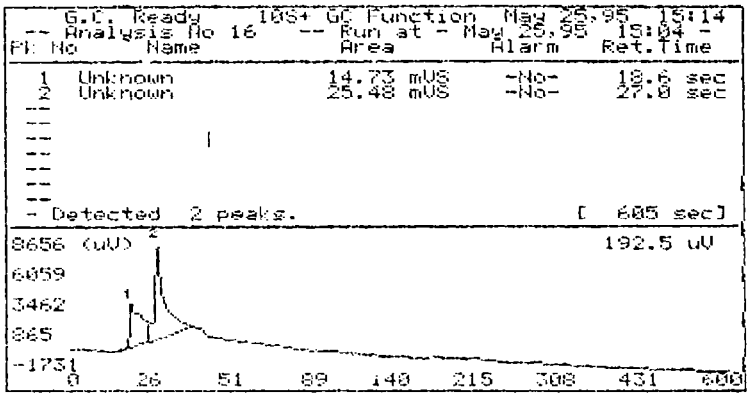
14.8 g



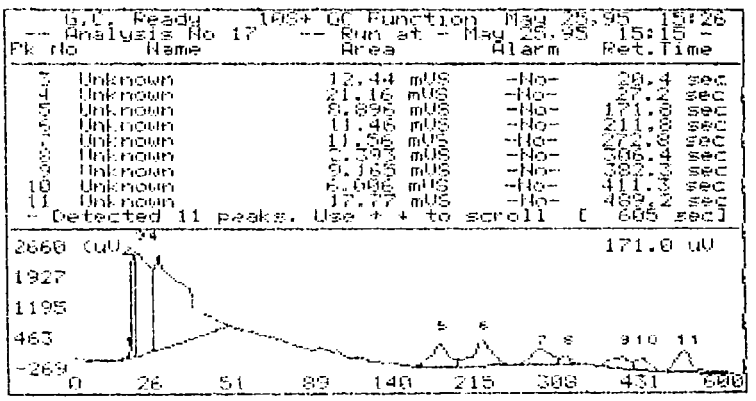
TCE



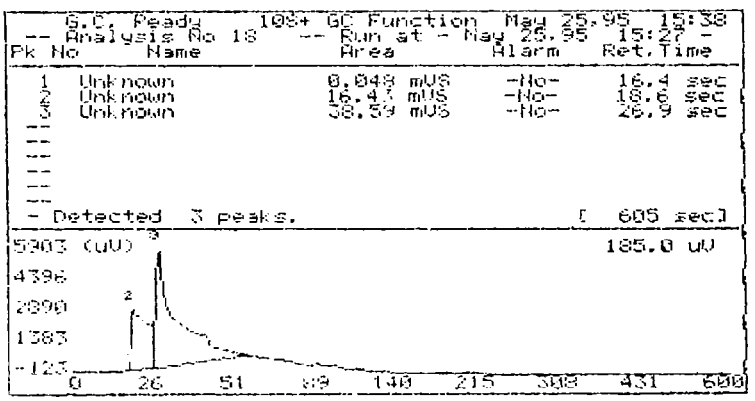
SB14-5-3.5
100 ml
9.5 g



SB14-5-5.5
100 ml
12.9 g



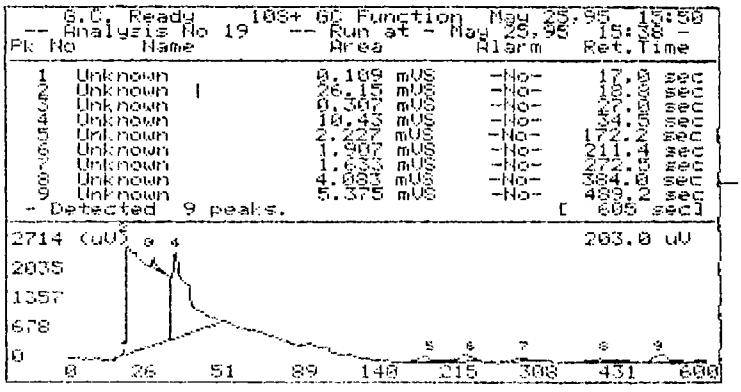
SB14-5-7.5
100 ml
10.6 g



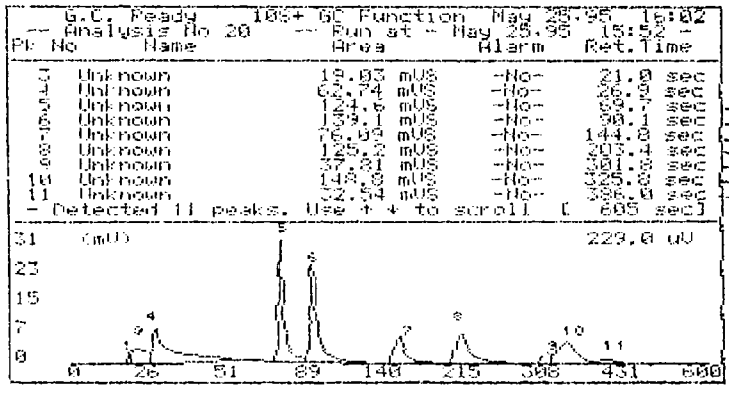
SB14-5-90

100 ml

12.8 g



X_o



B

TCE

T

PCE

E

$X_{1,1}$

X_1

GC Data (5/25/95)

SAMPLE ID	BENZENE	TCE	TOLUENE	PCE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE	Total
SB14-1-6.0	0.0	1126.5	0.0	0.0	0.0	0.0	848.8	1975.3
SB14-1-4.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	17.8
SB14-1-3.5	0.0	2.7	0.0	0.0	0.0	0.0	0.0	2.7

APPENDIX C

BORING AND WELL LOGS

ERM-West, Inc.
6111 North Scottsdale Road
Suite 103
Scottsdale, Arizona 85250
(602) 860-0360

ERM

BOREHOLE LOG

Borehole Number
SB4-1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/16/95

Logged By: S. Becker
Northing: 2291736.00
Easting: 14850820.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 9.25'

Depth (ft)	USCS Code	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
0	ML		6 7 9 8	0	0	silt, brown, not plastic, trace sand, rootlets, dry to moist
2			5 5 5 5	0	0.5	as above, 1/2" well rounded gravel
4			4 7 9 7	0	1.1	as above
5						silt, brown, low plasticity, trace clay and fine grain sand, dry to moist
8	SM		2 4 6 10	0	1.8	silty sand, brown, fine grain, moist to wet
9						silty sand, gray, fine grain, poorly graded, wet
10						

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6111 North Scottsdale Road
Suite 108
Scottsdale, Arizona 85250
(602) 960-0260
ERM

BOREHOLE LOG

Borehole Number
SB4-2

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/17/95

Logged By: S. Becker
Northing: 2291709.00
Easting: 14850856.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: N/A

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			10 25 22 25			silty sand, tan to brown, fine to medium grain, well graded, moist
1		ML						silt, brown, low plasticity, 1/2 - 1" gravel, trace sand, some rootlets, moist
2						0	0.3	
3							0	
4						0	0.3	as above
5					5 9 13 11			as above, not plastic
6		SM				0	0	silty sand, fine grain, some black organic material, moist
6		CL			2 3 4 4			clayey, sandy silt, orange to brown, medium plasticity, moist
8						0	0	as above, less sand
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

ERM-West, Inc.
6111 North Scottsdale Road
Suite 100
Scottsdale, Arizona 85250
(602) 860-0252

BOREHOLE LOG

Borehole Number
SB4-3

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/17/95

Logged By: S. Becker
Northing: 2291683.00
Easting: 14850885.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 8.00'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			8 14 17 20		0	silty sand, tan to brown, fine to medium grain, well graded, loose, moist
2		ML			6 9 11 16	0	0 0	silt, brown, low plasticity, trace sand, fine grain, moist as above, 1/2 - 1" gravel
3								as above
4					6 10 10 10	0	0	clayey silt, brown, medium plasticity, trace sand, 1/4 -1/2" gravel, moist
5		CL						
6						0	0	as above
7								
8			▼				0	
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

ERM-West, Inc.
5111 North Scottsdale Road
Suite 108
Scottsdale, Arizona 85250
(602) 990-9360

BOREHOLE LOG

Borehole Number SB4-4

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/16/95

Logged By: S. Becker
Northing: 2291649.00
Easting: 14850870.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 9.25'

Depth (ft)	USCS Code	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1	SM	7 12 21			silty sand, brown, fine grain, poorly graded, moist
2	ML	15 4	0	0	silt, brown, not plastic, 1/2 – 1" gravel, dry to moist as above, tan color, moist
3		6 9			
4	SM	10 5	0	0	sandy silt, brown, low plasticity, fine grain sand, moist
5		9 11			
6		11 3	0	0	as above, less sand, trace organics (black material)
7		3 5			
8		3 2	0	0	as above
9	SP	4 8	0	0	sand, brown to black, fine grain, poorly sorted, moist
10		15			
11					
12					
13					
14					
15					
16					
17					
18					
19					

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Suite 108
Scottsdale, Arizona 85250
(602) 990-0360
ERM

BOREHOLE LOG

Borehole Number
SB4-5

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/16/95

Logged By: S. Becker
Northing: 2291646.00
Easting: 14850796.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 9.25'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			4 4 6 21			silty gravelly sand, medium grain, poorly graded, moist
2		ML				0	0	silt, brown, not plastic, stiff, dry
3					6 12 12 12			as above, moderate odor (petroleum-like and solvent-like)
4						130	127	silt, green, low plasticity, moist
5		SM			6 9 11 14		83	silty sand, brown to gray, fine grain, poorly graded, crumbly, moist
6						643	61 340	as above, moderate odor (solvent-like)
7					3 5 5 6			
8						28	167 103	as above
9		SP	▼		2 4 10 15	162	37	sand, brown to black, fine grain, poorly graded, wet
10								as above
11								
12								
13								
14								
15								
16								
17								
18								
19								

ERM-West, Inc.
5111 North Scottsdale Road
Suite 108
Scottsdale, Arizona 85250
(602) 990-0360

BOREHOLE LOG

Borehole Number SB4-6

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/16/95

Logged By: S. Becker
Northing: 2291690.00
Easting: 14850800.00
Total Depth: 12.00'
Borehole Dia.: 8.00in
Water Level:

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			6 12 19 16			silty, gravelly, sand, brown, fine to coarse sand, 1/4" gravel, moist to wet
1		CL				0		
2							0	clayey silt, brown, low to medium plasticity
3								
4					3			as above
5					6 7 6			as above, trace fine grain sand, 1/4" gravel
6						0	0	clayey, sandy silt, brown, low to medium plasticity, moist
7		SM			3 3 6 8			silty sand, brown, fine grain, poorly graded, moist
8						0		sandy silt, brown, not plastic, dry to moist
9					3 4 7 16			as above, gray color, moderate odor (petroleum-like)
10					4 12	1,707	386	sand, brown, fine grain, poorly graded, wet
11		SP			10 16			
12						0	0	as above
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BOREHOLE LOG

Borehole Number
SB4-7

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/17/95

Logged By: S. Becker
Northing: 2291627.00
Easting: 14850761.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 8.50'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
0		ML			7			silt, brown, trace sand, crumbly, dry
1					8 9 9			as above, rootlets
2		SM			4	0	0	silty sand, brown, fine grain, moist
3					6 9 6			sandy silt, brown, cohesive, some rootlets, dry to moist
4					3	0	0	silty sand, brown, fine grain, moist
5					6 8 5			sandy silt, fine grain sand, cohesive, brown to orange, some coarse grain sand, moist
6					3	0	0	silty sand, orange to brown, fine grain, poorly graded, moist
7					3 6 5			sandy silt, brown, low plasticity, moist
8		ML	▼				0	silty sand, brown, fine grain, moist to wet
9		SP						silt, brown, cohesive, low plasticity, moist
10								gravelly sand, brown, loose, fine to coarse grain, wet
11								as above, some 1" gravel
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BOREHOLE LOG

Borehole Number SB5-1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/21/95

Logged By: S. Becker
Northing: 2292488.00
Easting: 14850781.00
Total Depth: 4.00'
Borehole Dia.: 8.00in
Water Level: 2.25'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
0		ML			3			silt, brown, loose, dry to moist
1					2			
2					3	0	0	sandy, gravelly silt, fine grain sand, poorly graded, wet
3					2			
4								as above
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BOREHOLE LOG

Borehole Number SB5-2

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/21/95

Logged By: S. Becker
Northing: 2292477.00
Easting: 14851243.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.75'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			6 8 28 5		0	gravelly silty sand, fine grain, poorly graded, 1/8 – 1" gravel (fill ?)
2		ML			6 6	685	88	as above, moderate odor (petroleum-like) gravelly, clayey silt, tan to brown, low to medium plasticity, 1/8 – 1" gravel, moist
3					12 16	23		
4		CL			5 6		0	as above, less gravel clay, brown to gray, high plasticity, slight odor (petroleum like), moist
5					10 17	24		clayey silt, orange-brown to gray, low to medium plasticity, moderate odor (petroleum-like)
6		SM			4		312	silty sand, brown to gray, fine to coarse grain, well graded, moderate odor (petroleum-like), moist
7		ML			6 12 16		27	clayey silt, brown, low to medium plasticity, moderate odor (petroleum-like), moist
8		CL SM				1,563	145	clay, tan to brown, high plasticity, moderate odor (petroleum-like), moist silty sand, tan to gray, fine to medium grain, poorly graded, moist to wet
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BOREHOLE LOG

Borehole Number
SB5-3

Project Number:	6001.31	Logged By:	S. Becker
Project Name:	Reno Air National Guard	Northing:	2292451.00
Location:	Reno, Nevada	Easting:	14851223.00
Contractor:	Layne-Western	Total Depth:	8.00'
Drilling Method:	Hollow-Stem Auger	Borehole Dia.:	8.00in
Date(s):	05/21/95	Water Level:	7.75'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		ML			5 12 30 30			0-2" asphalt paving
2						0	0	gravelly, silt, tan to brown, cohesive, not plastic, dry to moist
3					7 10 13 13			as above, rootlets gravelly, sandy silt, brown, loose, 1/8 - 1" gravel, fine grain sand, poorly graded, dry to moist (fill)
4						0	0	silt, tan to brown, low plasticity, crumbly, dry to moist
5					6 12 20 24			
6						0	0	clayey silt, brown, stiff, low to medium plasticity
7		SM			8 15 17 5			
8						0	0 0	silty sand, fine grain, poorly graded, moist to wet
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BOREHOLE LOG

Borehole Number
SB5-4

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/21/95

Logged By: S. Becker
Northing: 2292456.00
Easting: 14851200.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.75'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
0		ML			7			0-2" asphalt paving
1					8 12 10	0		silt, brown, low plasticity, rootlets, dry to moist
2					7		0	as above, some 1/2" gravel and rootlets
3					8 14 14	0		silt, tan, low plasticity, dry to moist
4					7		0	as above
5					12 17 17	0		
6					6		0	as above
7					10 8 7	0	0	clayey silt, brown, low to medium plasticity, moist
8		SM						silty sand, fine grain, poorly graded, moist to wet
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BOREHOLE LOG

Borehole Number SB7-1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/19/95

Logged By: S. Becker
Northing: 2291493.00
Easting: 14851785.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.75'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			18 18 16 10			0-2" asphalt paving gravelly, silty sand, tan to brown, fine grain, poorly graded, moist
2		CL ML			5	351	0	silt, brown to gray, medium plasticity, moist
3					10 15 17			as above, low plasticity, rootlets
4						730	162	as above, trace sand, moderate odor (petroleum-like)
5		SM			6 8 18 8			silty sand, gray to brown, low plasticity, moderate odor (petroleum-like), moist
6						7,143	693	as above, moderate to strong odor (petroleum-like)
7		MH			5 8 9			silt, brown to gray, medium plasticity, moist
8		SP	▼		10	3,000	527	sand, gray to black, poorly graded, wet strong odor (petroleum-like)
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BOREHOLE LOG

Borehole Number
SB7-2

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/19/95

Logged By: S. Becker
Northing: 2291461.00
Easting: 14851806.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 8.00'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		ML			22 12 11 13	0	160	0-2" asphalt paving silt, gray to black, some organic material, moderate odor (petroleum-like), dry to moist
2					4 8			gravelly, sandy silt, brown to gray, fine grain sand, moderate odor (petroleum-like), moist
3					12 12	4,285	228	
4					6 10			silt, brown to gray, trace clay, moderate odor (petroleum like), moist
5					25 21	17,314	412	silty sand, fine grain, poorly graded, moist
6		SM ML/MH			2 8			silt, brown to gray, low to medium plasticity, moist
7		SM			14 13	4,829	320	silty sand, fine grain, poorly graded, moist
8					4 10			
9					18 16			as above
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BOREHOLE LOG

Borehole Number SB7-3
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Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/19/95

Logged By: S. Becker
Northing: 2291412.00
Easting: 14851802.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.75'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			4 6 5 6			0-2" asphalt paving gravelly, silty sand, brown, 1/8 - 1" gravel, fine sand, moist
2		CL			7 7 9 16	176	6	clayey silt, gray to brown, low to medium plasticity, moist silty clay, gray to black, medium to high plasticity, moist moderate odor (petroleum-like), moist
5					8 10 18 17	10,223	264	as above, low to medium plasticity
6					3 4 10 8	25,592	215	as above, some sand silty clay, gray to black, medium to high plasticity, moist
8		SM				15,181	80	as above silty sand, fine grain, poorly graded, wet
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BOREHOLE LOG

Borehole Number
SB7-4

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/19/95

Logged By: S. Becker
Northing: 2291305.00
Easting: 14851808.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.75'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		ML			7 7 14 9			gravelly, sandy silt, brown, low plasticity, moist
2						0		silt, brown, low plasticity, dry to moist
3		CL			4 7 8 7		0	silty clay, tan to brown, moist, low to medium plasticity
4						0	0	as above, brown color, low plasticity
5		CH			4 4 5 5			clay, brown, high plasticity, moist
6						0	0	as above, medium to high plasticity
7					2 3 12 10			
8		SM				0	0	silty sand, gray to black, fine grain, poorly graded, wet
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BOREHOLE LOG

Borehole Number SB7-5
Page 1 of 1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/20/95

Logged By: S. Becker
Northing: 2291301.00
Easting: 14851798.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.50'

Depth (ft)	USCS Code	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1	SP		8 14 20 8			gravelly sand, fine to medium grain, well graded, rock fragments, moist
2	CL		2 9 12 16	0	137	as above, brown color
3					363	clayey silt, brown to gray, medium plasticity, slight odor (petroleum-like), moist
4			5 10 10 14	266	6	silty clay, gray to black, medium plasticity, moderate odor (petroleum-like), moist
5					400	as above, trace 1/2" gravel and sand
6			4 7 10 8	16,390	567	sandy clay, gray to black, low plasticity, moist
7	SP					silty clay, gray to black, medium to high plasticity, moist
8				5430	763	sand, gray to black, fine grain, poorly graded, wet
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BOREHOLE LOG

Borehole Number
SB7-6

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/20/95

Logged By: S. Becker
Northing: 2291329.00
Easting: 14851581.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 8.00'

Depth (ft)	USCS Code	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1	ML		10 20 18 6	0	2	gravelly silt, brown, low plasticity, 1/4 - 1.5" gravel (fill)
2						as above
3			4 8 16 23	72	15	clayey silt, gray to brown, low plasticity, moist
4			10 12 15 15		13	silt, orange to brown, not plastic, trace sand, moist
5				67		
6			8 11 8 9		0	clayey silt, gray, low plasticity, moist
7	CL					silty clay, gray, medium plasticity, trace gravel, moist as above, wet
8					0	
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BOREHOLE LOG

Borehole Number SB7-7

Project Number:	6001.31	Logged By:	S. Becker
Project Name:	Reno Air National Guard	Northing:	2291448.00
Location:	Reno, Nevada	Easting:	14851574.00
Contractor:	Layne-Western	Total Depth:	8.00'
Drilling Method:	Hollow-Stem Auger	Borehole Dia.:	8.00in
Date(s):	05/20/95	Water Level:	8.00'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM			10 26 18 20			silty, sandy gravel, brown, fine grain, gravel 1/2 – 1" diameter, loose, moist
		ML				106,415	427	silt, gray, low plasticity, moist
2					8		240	
3					10 15 15			as above (based on cuttings)
4		CL			4	825	463	silty clay, gray, medium plasticity, moist (GC sample only)
5					8 10 15			gravelly clay, tan to gray, 1/4 – 1" gravel, medium to high plasticity, moist
6					3	20,578	10.1 40	silty clay, tan to gray, low to medium plasticity, moderate odor (petroleum-like), moist
7					5 8 15			
8		SM	▼			121,683	832 18	silty sand, gray, fine grain, poorly graded, moist as above, wet
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BOREHOLE LOG

Borehole Number
SB7-8

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/20/95

Logged By: S. Becker
Northing: 2291485.00
Easting: 14851714.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.50'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
0		GM						0-2" asphalt paving
1								silty gravel, 1/8 - 3" gravel (fill)
2		ML			4			clayey silt, tan to gray, low plasticity, crumbly, dry to moist
3					7 10 12	9,624	620 150	
4					13			as above, moist
5					10 13 13			
6						1,876	30	silty clay, brown to gray, medium to high plasticity, moist
7		CL					0	
8		SM				504		silty sand, gray to black
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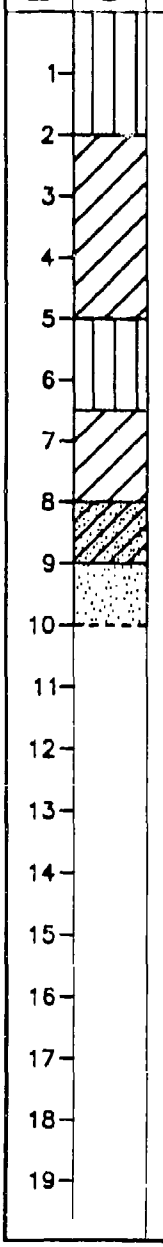
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BOREHOLE LOG

Borehole Number SB7-9

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/23/95

Logged By: S. Becker
Northing: 2291408.00
Easting: 14851831.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 8.25'



Depth (ft)	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1	ML			7 9 7 6			0-2" asphalt paving, silt, brown, some 1/2 - 1 " gravel, some sand, low plasticity, moist
2	CL			6 3 3 6	881	0	clayey silt, tan to brown, medium plasticity, moist
3							
4				3 6 7 11	620	1	as above
5	ML						silt, tan to brown, low plasticity, some 1/8 - 1" gravel, moist
6				3 9 8 8	1.2	0	as above, trace clay, medium plasticity
7	CL				0		clayey silt, tan to brown, some sand, low to medium plasticity, moist
8	SC	▼			24	0	as above, medium plasticity silty, clayey sand, fine grain, poorly graded, moist to wet
9	SP						sand, gray to black, fine grain, poorly graded, wet
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BOREHOLE LOG

Borehole Number SB7-10
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Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/23/95

Logged By: S. Becker
Northing: 2291304.00
Easting: 14851724.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.25'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		GM		12	12 34	0	0	sandy silty gravel, 1/8 – 1" gravel, well graded, moist to wet
2		CL						silty clay, some gravel, low to medium plasticity
3					5 10 14 13		9	
4					5	2,024	63	as above, moderate odor (petroleum-like)
5					6 12 20	12,798		silty clay, tan to brown, medium plasticity, moderate odor (petroleum-like)
6					3		72	
7					10 20 40	127	30 21	as above as above, medium to high plasticity
8		SP						sand, gray to black, fine grain, poorly graded, wet
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BOREHOLE LOG

Borehole Number SB7-11
Page 1 of 1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/23/95

Logged By: S. Becker
Northing: 2291304.00
Easting: 14851643.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 6.75'

Depth (ft)	USCS Code	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1	GM		13 25 20 25			silty, sandy gravel, poorly graded, moist
1	CL			4,200	380	silty clay, tan to gray, low plasticity, moderate odor (petroleum-like), moist
2			4		407	
2	ML		8			silt, trace clay, crumbly, moist
3			12 20			
3				5,819	1451	as above, strong odor (petroleum-like)
4	CL		3		170	clayey silt, tan to gray, low to medium plasticity, strong odor (petroleum-like), moist
5			7 14 17			
6				30,866	1741 1730	silty clay, tan to gray, medium plasticity, moist
7	SP			23,408		sand, gray to black, fine grain, poorly graded, wet
8					700 485	

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BOREHOLE LOG

Borehole Number
SB7-12

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/22/95

Logged By: S. Becker
Northing: 2291450.00
Easting: 14851547.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 7.75'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
0		GP			3			cobbles, 0-2" diameter
1		ML			7 7 10	0		silt, tan to brown, trace clay, low plasticity, moist
2		CL			3		0	silty clay, tan to brown, medium plasticity, moist
3					4 7 8			
4					4	0	0	as above, low to medium plasticity
5					10 10 10			
6					3	0	0	as above
7					10 9 12			
8		SM	▼			0	0	silty sand, gray to black, fine grain, poorly graded, wet
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

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BOREHOLE LOG

Borehole Number SB14-1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/24/95

Logged By: S. Becker
Northing: 2292424.00
Easting: 14851723.00
Total Depth: 8.00'
Borehole Dia.: 8.00in
Water Level: 6.25'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM						silty sand, orange to brown, fine grain, poorly graded, moist
2		CL						clayey silt, brown, low plasticity, moist
3				4 5 4 4				
4						2.7 18	0	silty clay, brown, high plasticity, moist
5							30	as above, medium to high plasticity, slight odor (petroleum like)
6			▼			1,975		as above, based on cuttings
7		SM						silty sand, gray to black, fine grain, poorly graded, wet
8							0	as above, less silt
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

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BOREHOLE LOG

Borehole Number
SB14-2

Project Number:		Logged By:	S. Becker
Project Name:	Reno Air National Guard	Northing:	2292396.00
Location:	Reno, Nevada	Easting:	14851745.00
Contractor:	Layne-Western	Total Depth:	10.00'
Drilling Method:	Hollow-Stem Auger	Borehole Dia.:	8.00in
Date(s):	05/24/95 - 05/24/95	Water Level:	8.25'

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		GW						gravel, 1-3", well graded
1		CL						clayey silt, brown, low plasticity, moist
2					5			
3					7 20 24	0		
3		SM					0	silty sand, brown, fine grain, poorly graded, moist
4					3		0	
5					9 9 12			as above, tan to brown, trace 1/8 - 1" gravel
6		CL				0	0	clayey silt, brown, some gravel, 1/8 - 1" gravel, low to medium plasticity, moist
7		SM						silty sand, gray, fine grain, poorly graded, moist
8						0	0	
9								silty sand, gray to brown, fine grain, poorly graded, wet rock fragments on tip of sample
10							0	
11								
12								
13								
14								
15								
16								
17								
18								
19								

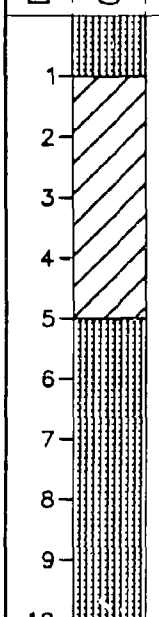
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BOREHOLE LOG

Borehole Number SB14-3

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/24/95

Logged By: S. Becker
Northing: 2292377.00
Easting: 14851730.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 8.25'



Depth (ft)	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
0	SM						0-2" asphalt paving
1	CL						gravelly, silty sand, brown, fine grain, poorly graded, moist
2						0	silty clay, brown, medium plasticity, moist
3							clayey silt, brown, low plasticity, moist
4							as above, low to medium plasticity
5	SM			6 12 18 14			silty sand, tan, fine grain, poorly graded, moist
6					2,697	700	as above, color change to gray, moderate odor (petroleum-like)
7				4 4 10 10			as above, color change to gray to black
8		▽			682	60	as above, mild odor (petroleum-like)
9						29	as above, wet
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							

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BOREHOLE LOG

Borehole Number
SB14-4

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/24/95

Logged By: S. Becker
Northing: 2292408.00
Easting: 14851721.00
Total Depth: 1.50'
Borehole Dia.: 8.00in
Water Level:

Depth (ft)	Graphic Log	USCS Code	Water Level	Sample Recovery	Blow Counts	Field GC (ug/kg)	PID (ppm)	Description/Soil Classification
1		SM						gravelly, silty sand, 1/8 – 1" gravel, fine grain, poorly graded, moist
								concrete vault encountered at 1.5', terminate boring
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

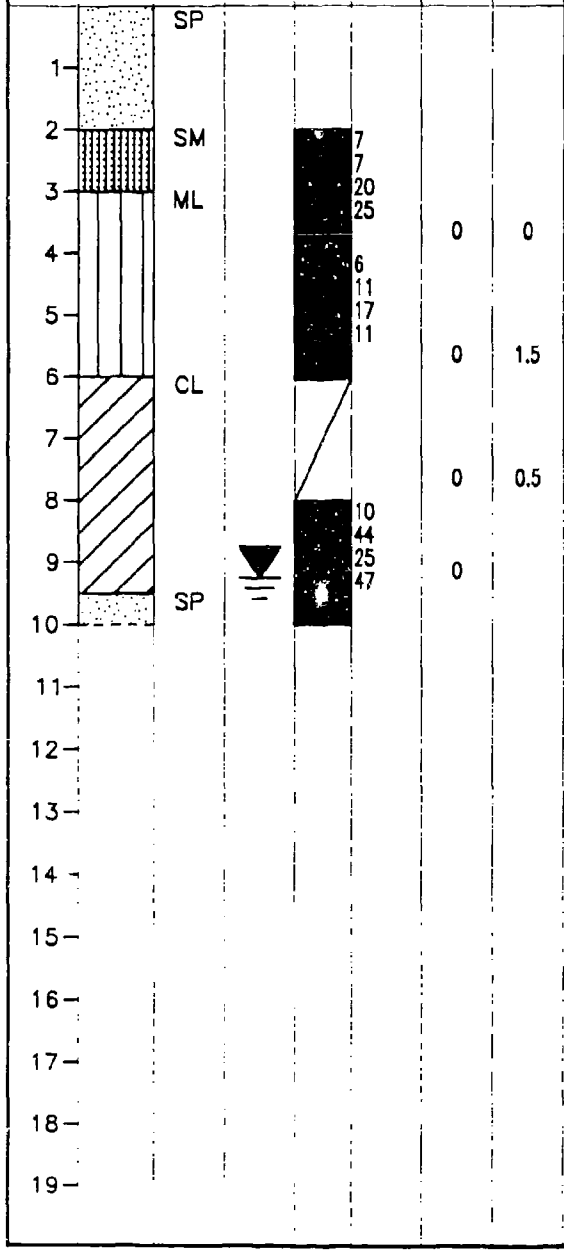
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BOREHOLE LOG

Borehole Number SB14-5

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Date(s): 05/25/95

Logged By: S. Becker
Northing: 2292360.00
Easting: 14851730.00
Total Depth: 10.00'
Borehole Dia.: 8.00in
Water Level: 9.25'



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BOREHOLE LOG

Borehole Number
SB7T-1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/18/95 - 05/23/95
Total Depth: 11.00'
Completed Depth: 11.00'

Northing: 2291425.00
Easting: 14851721.00
Borehole Dia.: 8.00in

Well Construction

Blank C
type: PV dia: 2.00in fm: .1' to: 3.00'

Screens:
type: Slotted size: .010in dia: 2.00in fm: 3.00' to: 10.50'

Annular Fill:
type: Grout fm: .20' to: .50'
type: Bentonite fm: .50' to: 2.00'
type: Sand Filter fm: 2.00' to: 11.00'

Depth (ft)	Graphic Log	USCS Code	Water Level	Well Construction	Sample Recovery	Blow Counts	PID (ppm)	Description/Soil Classification
				MP. EL. 4399.50				
1		SM						0-2" asphalt paving
2							10	gravelly, silty sand, brown to gray, fine to medium grain, moderate odor (petroleum-like), moist to wet
3							265	
4							130	
5			▽				381	as above
6		SP						sand, gray to black, poorly graded, moderate to strong odor (petroleum-like), wet
7								
8								
9							522	as above, fluid that appears to be free product appears on soil cuttings
10		GP						
11								gravel, poorly graded, moist to wet, very difficult drilling at 11'
12								
13								
14								
15								
16								
17								
18								
19								

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BOREHOLE LOG

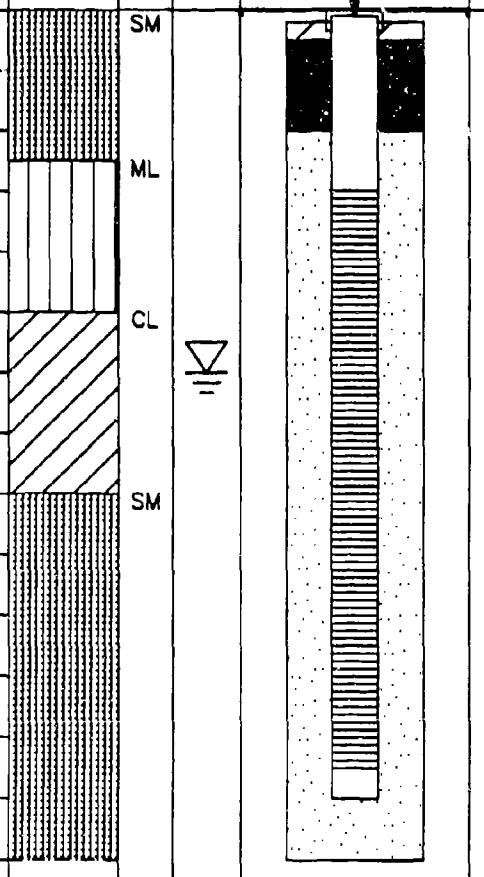
Borehole Number
SB71-2
Page 1 of 1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/18/95 - 05/23/95
Total Depth: 14.00'
Completed Depth: 13.00'

Northing: 2291425.00
Easting: 14851743.00
Borehole Dia.: 8.00in

Well Construction

Blank Casing: type: PVC	dia: 2.00in	fm: .1'	to: 3.00'	
Screens: type: Slotted	size: .010in	dia: 2.00in	fm: 3.00'	to: 12.50'
Annular Fill: type: Grout			fm: .20'	to: .50'
type: Bentonite			fm: .50'	to: 2.00'
type: Sand Filter			fm: 2.00'	to: 14.00'



Sample Recovery	Blow Counts	PID (ppm)	Description/Soil Classification
			0-2" asphalt paving
		0	gravelly, silty sand, fine grain, 1/8 - 1" gravel, poorly graded, dry to moist
		71	gravelly silt, brown to gray, low plasticity, moderate odor (petroleum-like), moist
		85	clayey silt, brown to gray, trace gravel, low to medium plasticity, moderate odor (petroleum-like), moist to wet
			as above, no gravel
		283	silty sand, gray, poorly graded, moderate odor (petroleum-like), wet
			as above
			as above

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BOREHOLE LOG

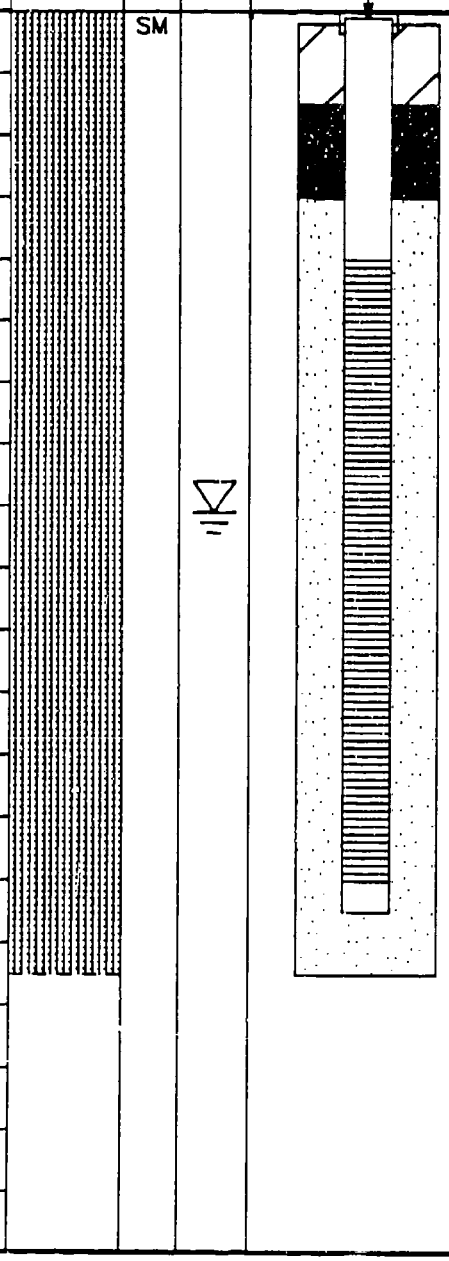
Borehole Number
SB7T-3

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/23/95
Total Depth: 15.50'
Completed Depth: 14.50'

Northing: 2291383.00
Easting: 14851720.00
Borehole Dia.: 15.00in

Well Construction

Blank Casing: type: PVC	dia: 6.00in	fm: .1'	to: 4.00'
Screens: type: Slotted size: .010in	dia: 6.00in	fm: 4.00'	to: 14.00'
Annular Fill: type: Grout		fm: .20'	to: 1.50'
type: Bentonite		fm: 1.50'	to: 3.00'
type: Sand Filter		fm: 3.00'	to: 15.50'



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BOREHOLE LOG

Borehole Number
SB7T-4

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/24/95
Total Depth: 19.00'
Completed Depth: 18.00'

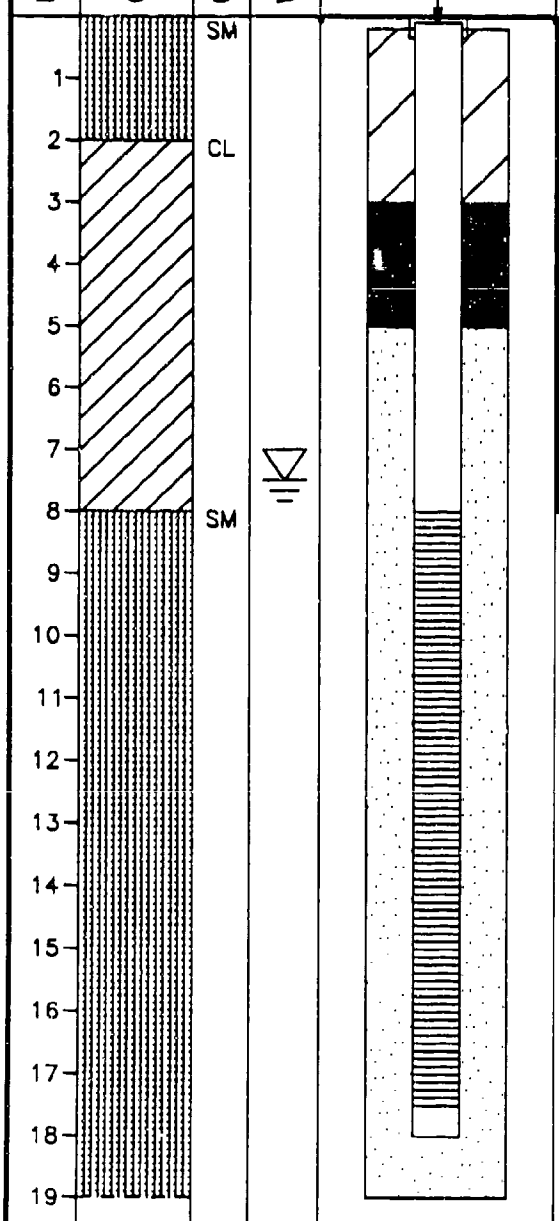
Northing: 2291304.00
Easting: 14851685.00
Borehole Dia.: 8.00in

Well Construction

Blank Casing:
type: PVC dia: 2.00in fm: .1' to: 8.00'

Screens:
type: Slotted size: .010in dia: 2.00in fm: 8.00' to: 17.50'

Annular Fill:
type: Grout fm: .20' to: 3.00'
type: Bentonite fm: 3.00' to: 5.00'
type: Sand Filter fm: 5.00' to: 19.00'



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BOREHOLE LOG

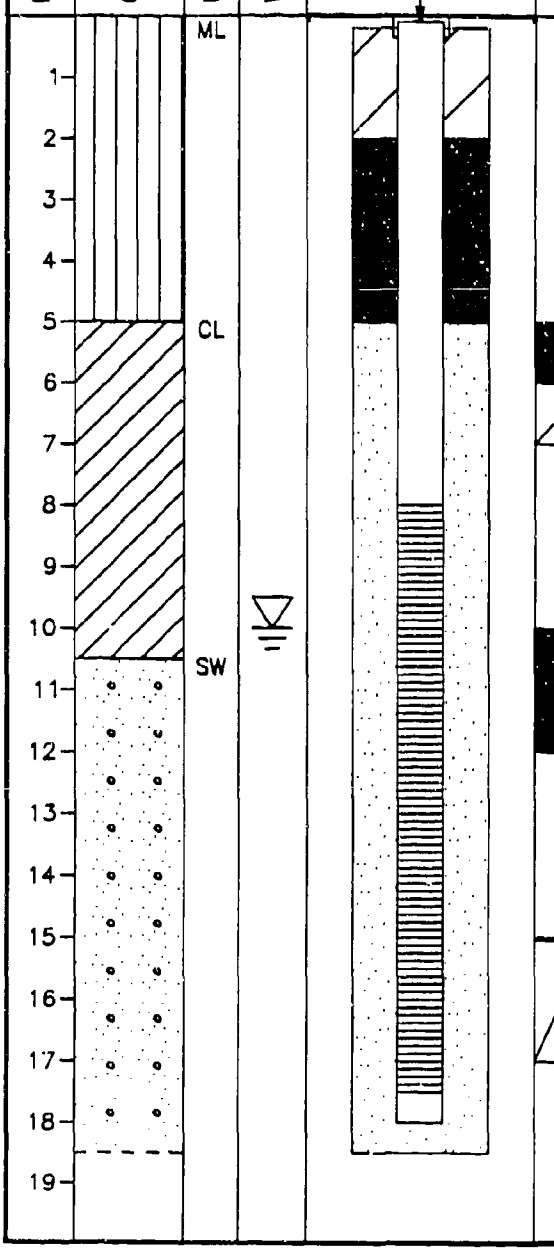
Borehole Number
MW-28

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/18/95
Total Depth: 18.50'
Completed Depth: 18.00'

Northing: 2291746.00
Easting: 14850936.00
Borehole Dia.: 8.00in

Well Construction

Blank Casing: type: PVC	dia: 2.00in	fm: .1'	to: 8.00'	
Screens: type: Slotted	size: .010in	dia: 2.00in	fm: 8.00'	to: 17.50'
Annular Fill: type: Grout			fm: .20'	to: 2.00'
type: Bentonite			fm: 2.00'	to: 5.00'
type: Sand Filter			fm: 5.00'	to: 18.50'



Description/Soil Classification	PID (ppm)
silt, brown, cohesive, some sand and gravel, sand fine grain, gravel 1/2", dry to moist	
silty clay, orange to brown, low to medium plasticity, some organic material, moist	0
as above	
sand, gray to black, fine to coarse, well graded, wet	0
as above, 1/2 – 3/4" gravel	
as above	0

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BOREHOLE LOG

Borehole Number
MW-29

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/18/95
Total Depth: 18.50'
Completed Depth: 18.00'

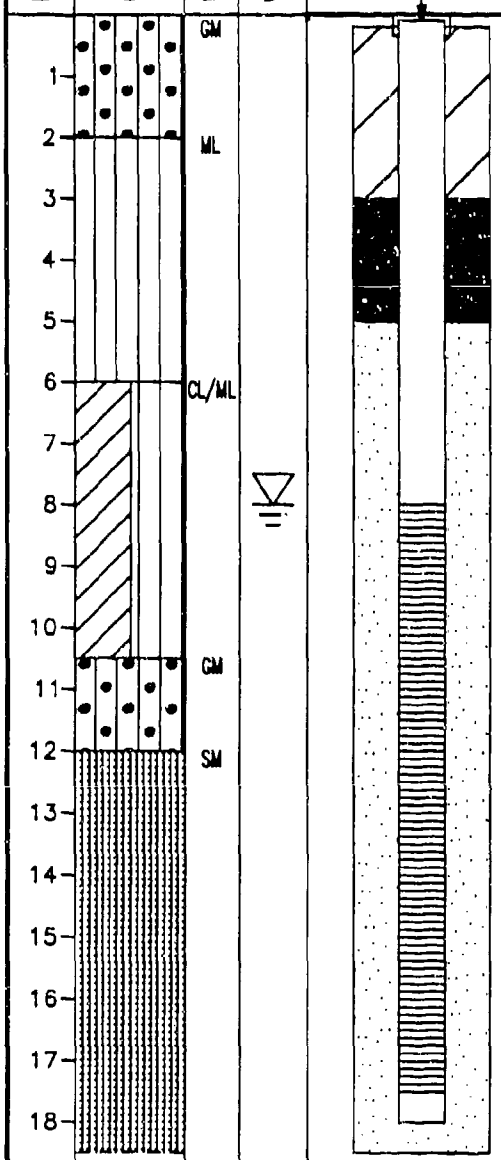
Northing: 2291701.00
Easting: 14850936.00
Borehole Dia.: 8.00in

Well Construction

Blank Casing:
type: PVC dia: 2.00in fm: .1' to: 8.00'

Screens:
type: Slotted size: .010in dia: 2.00in fm: 8.00' to: 17.50'

Annular Fill:
type: Grout fm: .20' to: 3.00'
type: Bentonite fm: 3.00' to: 5.00'
type: Sand Filter fm: 5.00' to: 18.50'



Sample Recovery	Blow Counts	PID (ppm)	Description/Soil Classification
		0	silty trace sand, dry to moist (fill?)
			clayey silt, brown to tan, low plasticity, moist
		0.1	as above
			silty clay to clayey silt, brown, medium plasticity, mo
		0	as above, less clay, wet
			sandy gravel, brown to gray, wet
			silty sand, gray, fine grain, poorly graded, wet
		0	as above, less silt
			as above

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BOREHOLE LOG

Borehole Number
MW-30

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/22/95
Total Depth: 19.00'
Completed Depth: 18.00'

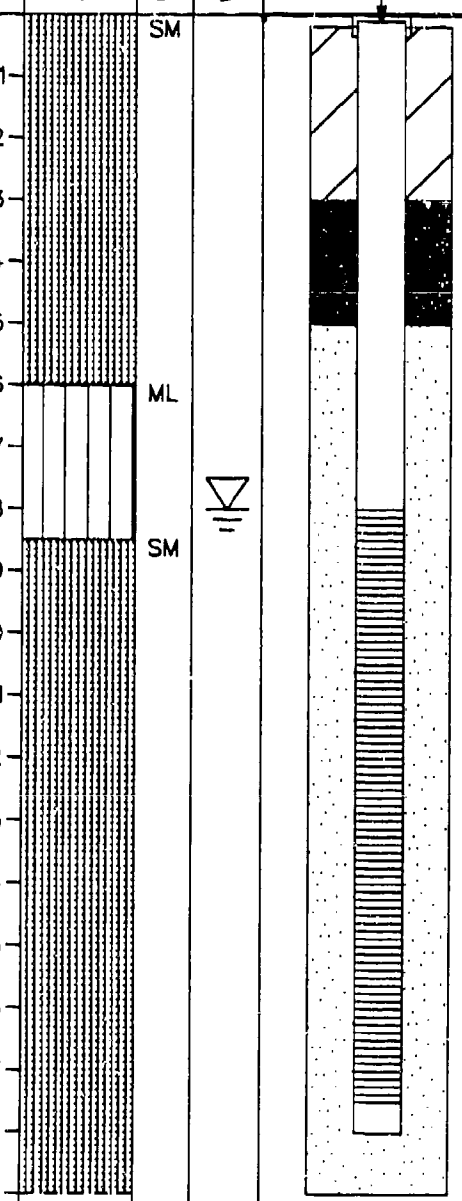
Northing: 2292462.00
Easting: 14851331.00
Borehole Dia.: 8.00in

Well Construction

Blank Casing:
type: PVC dia: 2.00in fm: .1' to: 8.00'

Screens:
type: Slotted size: .010in dia: 2.00in fm: 8.00' to: 17.50'

Annular Fill:
type: Grout fm: .20' to: 3.00'
type: Bentonite fm: 3.00' to: 5.00'
type: Sand Filter fm: 5.00' to: 19.00'



PID (ppm)	Description/Soil Classification
0	0–2" asphalt paving gravelly, silty sand, tan, fine grain, poorly graded, dry to moist
0	gravelly sandy silt, brown, low plasticity, moist
0	silty sand, tan to brown, fine grain, poorly graded, moist to wet
0	as above small rock at 16' silty sand, tan to brown, fine grain, poorly graded, wet
0	

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BOREHOLE LOG

Borehole Number
MW-31
Page 1 of 1

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/20/95
Total Depth: 19.00'
Completed Depth: 18.00'

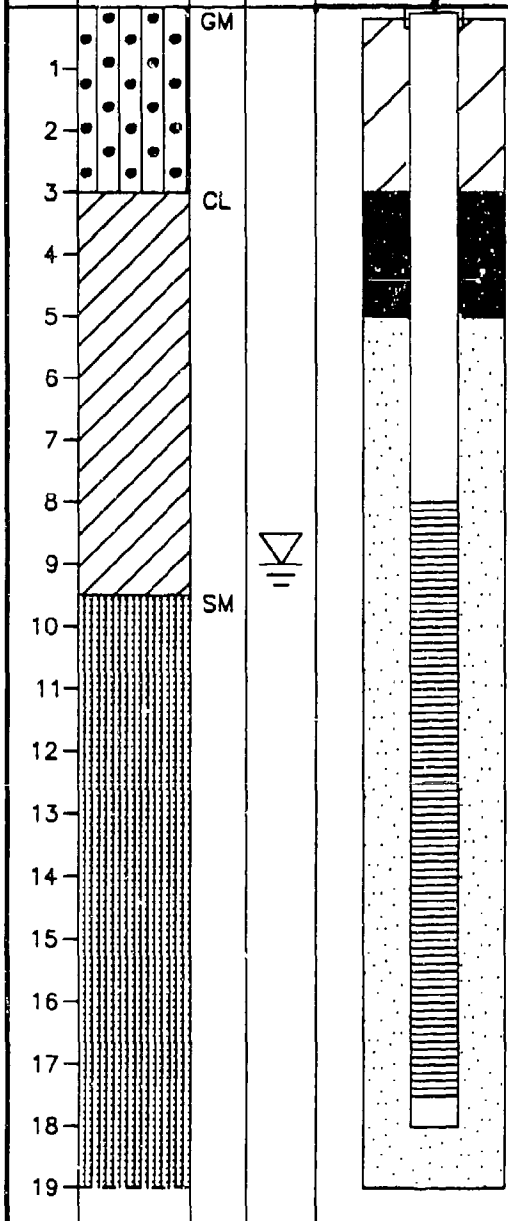
Northing: 2291329.00
Easting: 14851821.00
Borehole Dia.: 8.00in

Well Construction

Blank Casing:
type: PVC dia: 2.00in fm: .1' to: 8.00'

Screens:
type: Slotted size: .010in dia: 2.00in fm: 8.00' to: 17.50'

Annular Fill:
type: Grout fm: .20' to: 3.00'
type: Bentonite fm: 3.00' to: 5.00'
type: Sand Filter fm: 5.00' to: 19.00'



PID (ppm)	Description/Soil Classification
0	0–2" asphalt paving silty, sandy gravel, brown, fine grain, poorly graded sa well rounded gravel up to 1" diameter, moist
	clayey silt, brown to gray, low plasticity, moist
	sandy, clayey silt, low plasticity, fine grain sand, poorly graded, moist
0	
	silty sand, fine grain, poorly graded, moist
0	as above, increase in sand content
0	as above

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BOREHOLE LOG

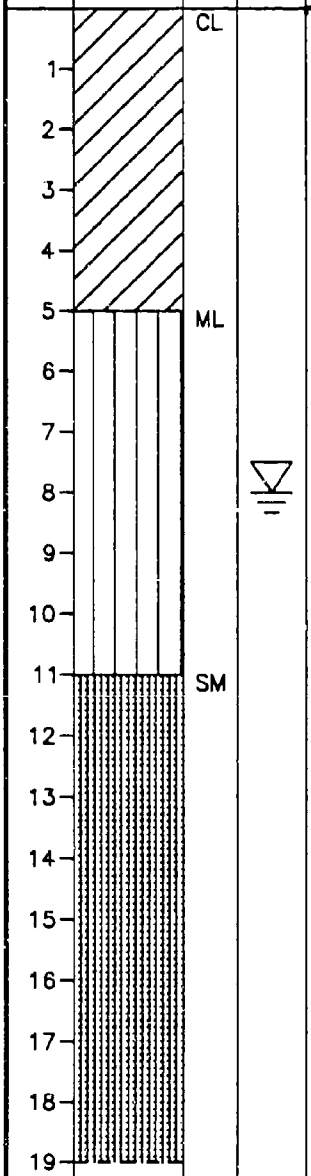
Borehole Number
MW-32

Project Number: 6001.31
Project Name: Reno Air National Guard
Location: Reno, Nevada
Contractor: Layne-Western
Drilling Method: Hollow-Stem Auger
Logged By: S. Becker
Date(s): 05/21/95
Total Depth: 19.00'
Completed Depth: 18.00'

Northing: 2292544.00
Easting: 14851155.00
Borehole Dia.: 8.00in

Well Construction

Blank Casing: type: PVC	dia: 2.00in	fm: .1'	to: 8.00'
Screens: type: Slotted	size: .010in dia: 2.00in	fm: 8.00'	to: 17.50'
Annular Fill: type: Grout		fm: .20'	to: 3.00'
type: Bentonite		fm: 3.00'	to: 5.00'
type: Sand Filter		fm: 5.00'	to: 19.00'



PID (ppm)	Description/Soil Classification
0	silty clay, tan, low to medium plasticity, moist
0	sandy silt, tan, low plasticity, fine grain sand, moist
	rocks at 7'
0	as above
	silty sand, gray to brown, fine grain, poorly graded, wet
	as above
0	

APPENDIX D

LOCATION AND ELEVATION SURVEY

PYRAMID Engineers & Land Surveyors
330 Crampton St., Reno, NV 89502
(702) 329-2540 • Fax (702) 329-2768

LETTER OF TRANSMITTAL

DATE 6/28/95	JOB NO 95072
ATTENTION Robin Weesner	
RE Nevada Air Guard Moniter Well Survey	

TO ERM West
5111 N. Scottsdale Rd., Ste. 108
Scottsdale AZ 85250

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Printout of coordinate values
1			Reduced plot of well locations
1			Tabulation of well elevations
1			Xerox of field notes
1			DXF file of drawing

RECEIVED
JUL 03 1995
ERM-WEST INC.
PHOENIX, AZ.

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☒ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO File

SIGNED: Michael J. Miller

If enclosures are not as noted, kindly notify us at once

Point	Northing	Easting	Elevation	Note
1	5000.000000	5000.000000	0.000	SPIKE AT POB
2	5000.000000	4118.540000	0.000	SPIKE AT INTX
3	6059.347162	5085.413970	0.000	SPIKE WK PT
~~50~~	~~5019.906983~~	~~4745.718145~~	~~-0.234~~	~~S B 7 6~~ omit
51	4994.905367	4848.529548	-1.087	-4
52	4995.766980	4807.288608	-0.906	SB 7- 1
53	4992.279636	4962.370794	-1.900	B 7-10
54	4996.155569	4972.393001	-1.613	B 7-4
55	5019.536072	4984.911395	-0.875	MW 31
56	5099.983021	4995.595794	-0.070	SB 7-9
57	5149.838954	4972.739629	-0.671	MW 06
58	5152.858674	4969.979535	-0.638	SB 7-2
59	5184.378618	4949.309826	-0.347	SB 7-1
60	5103.032604	4966.260161	-0.896	SB 7-3
61	5064.811470	4957.931039	-1.369	MW 7
62	5073.946910	4884.267391	-0.306	-3
63	5115.597734	4885.072838	-4.181	-3
64	5115.839758	4907.415945	-4.476	T-2
65	5176.139057	4878.842369	-3.855	SB 7-8
66	5038.785652	4749.660626	-4.144	TEMP WK PT
67	4995.392750	4888.257044	-10.735	SB 7-10
68	4995.126791	4713.851973	-5.423	~~RED 6 GR 9 GRAV~~ SB 7-6
69	5139.685502	4738.456807	-4.073	SB 7-7
70	5141.360636	4711.586904	-5.369	SB 7-12
71	4999.952354	4118.508122	0.049	COORDINATE CHECK
72	5266.367922	4100.770036	0.000	SPIKE WK PT
73	6109.854435	4123.382684	0.000	P-K IN AC
74	5391.632537	4099.688004	-4.210	MW29
75	5436.169834	4099.430901	-4.236	MW28
76	5380.565569	3964.417470	-3.910	SB4-6
77	5400.093942	4020.091029	-4.381	SB4-2
78	5426.579370	3983.916061	-0.576	SB4-1
79	5374.151493	4049.682390	-0.688	SB4-3
80	5340.158328	4033.993414	-0.299	SB4-4
81	5336.790111	3960.629821	-0.471	SB4-5
82	5318.199378	3925.722460	0.014	SB4-7
83	6142.434941	4386.444901	3.844	SB5-3
84	6146.879686	4363.616845	-4.902	SB5-4
85	6168.349402	4406.454644	2.069	SB5-2
86	6234.295523	4318.149512	-7.229	MW 32
87	6153.133929	4493.911466	-0.558	MW30
88	6051.908057	4894.185514	-5.062	SB14-5
89	6068.666463	4893.436365	-4.655	SB14-3
90	6087.844830	4908.840344	-4.692	SB14-2
91	6115.824383	4886.288381	-0.210	SB14-1
92	6099.154541	4884.907765	0.412	SB14-4
93	6099.033602	4902.136554	-0.681	MW 15

ERM West.
95072

DB: Name AIRGUARD,Date 5-30-1995,Time 08:55:54.24
Mode Setup: North Azimuth,Dist feet,Scale 1.0000,Earth crv ON,Angle Deg
Store: Pt 1,N 5000.0000,E 5000.0000,Elv 100.0000,START
tore: Pt 2,N 5000.0000,E 4118.5400,Elv 0.0000,SPIKE AT INTX
tore: Pt 1,N 5000.0000,E 5000.0000,Elv 0.0000,SPIKE AT POB
Store: Pt 150,N -99999.9900,E -99999.9900,Elv -99999.9900,
"I / HR : Inst H 0.0000,Rod H 0.0000
ote: BS point check:1-2, Horiz err: -0.016, Vert err: 5.230
ccupy: Occ 1,N 5000.0000,E 5000.0000,Elv 0.0000,SPIKE AT POB
Backsight: Occ 1,BS Pt 2,BS azm 270.0000,Back circle 0.0000
ide Shot: 1-50,Ang-Rt 4.2835,Zenith 90.0310,Slp Dst 255.0600,S B 7-6
ide Shot: 1-51,Ang-Rt 358.0425,Zenith 90.2440,Slp Dst 151.5600,-4
Side Shot: 1-52,Ang-Rt 358.4430,Zenith 90.1610,Slp Dst 192.7600,SB 7-11
Side Shot: 1-53,Ang-Rt 348.2420,Zenith 92.4955,Slp Dst 38.4600,B 7-10
ide Shot: 1-54,Ang-Rt 352.0420,Zenith 93.1840,Slp Dst 27.9200,B 7-4
ide Shot: 1-55,Ang-Rt 52.1910,Zenith 92.0150,Slp Dst 24.7000,MW 31
Side Shot: 1-56,Ang-Rt 87.2840,Zenith 90.0225,Slp Dst 100.0800,SB 7-9
Side Shot: 1-57,Ang-Rt 79.4120,Zenith 90.1510,Slp Dst 152.3000,MW 06
ide Shot: 1-58,Ang-Rt 78.5320,Zenith 90.1405,Slp Dst 155.7800,SB 7-2
ide Shot: 1-59,Ang-Rt 74.3740,Zenith 90.0615,Slp Dst 191.2200,SB 7-1
Side Shot: 1-60,Ang-Rt 71.5205,Zenith 90.2825,Slp Dst 108.4200,SB 7-3
ide Shot: 1-61,Ang-Rt 57.0045,Zenith 91.0055,Slp Dst 77.2800,MW 7
ide Shot: 1-62,Ang-Rt 32.3435,Zenith 90.0740,Slp Dst 137.3400,-3
ide Shot: 1-63,Ang-Rt 45.1000,Zenith 91.2810,Slp Dst 163.0600,-3
Note: LAST SHOT T-1
ide Shot: 1-64,Ang-Rt 51.2200,Zenith 91.4345,Slp Dst 148.3600, T-2
ide Shot: 1-65,Ang-Rt 55.2840,Zenith 91.0200,Slp Dst 213.8200,SB 7-8
Traverse: 1-66,Ang-Rt 8.4825,Zenith 90.5615,Slp Dst 253.3600,TEMP WK PT
Note: BS point check:66-1, Horiz err: -0.018, Vert err: -10.161
ccupy: Occ 66,N 5038.7857,E 4749.6606,Elv -4.1440,TEMP WK PT
acksight: Occ 66,BS Pt 1,BS azm 98.4825,Back circle 0.0000
Side Shot: 66-67,Ang-Rt 8.3440,Zenith 92.3555,Slp Dst 145.3800,SB 7-10
ide Shot: 66-68,Ang-Rt 120.3305,Zenith 91.1750,Slp Dst 56.4800,RED 6 OR 9 GRA
ide Shot: 66-69,Ang-Rt 254.5125,Zenith 89.5735,Slp Dst 101.5200,SB 7-7
ide Shot: 66-70,Ang-Rt 240.4945,Zenith 90.3830,Slp Dst 109.4200,SB 7-12
Side Shot: 66-71,Ang-Rt 167.4020,Zenith 89.3715,Slp Dst 632.3600,COORDINATE CH
ote: BS point check:2-1, Horiz err: 0.001, Vert err: -5.817
tore: Pt 72,N 5266.3679,E 4100.7700,Elv 0.0000,SPIKE WK PT
Store: Pt 73,N 6109.8544,E 4123.3827,Elv 0.0000,P-K IN AC
Note: BS point check:72-73, Horiz err: 0.010, Vert err: 0.956
ccupy: Occ 72,N 5266.3679,E 4100.7700,Elv 0.0000,SPIKE WK PT
acksight: Occ 72,BS Pt 73,BS azm 1.3208,Back circle 0.0000
Side Shot: 72-74,Ang-Rt 357.5810,Zenith 91.5530,Slp Dst 125.3400,MW29
Side Shot: 72-75,Ang-Rt 358.0045,Zenith 91.2545,Slp Dst 169.8600,MW28
ide Shot: 72-76,Ang-Rt 308.2440,Zenith 91.1535,Slp Dst 177.9000,SB4-6
ide Shot: 72-77,Ang-Rt 327.2140,Zenith 91.3625,Slp Dst 156.2400,SB4-2
Side Shot: 72-78,Ang-Rt 322.2130,Zenith 90.1000,Slp Dst 198.3000,SB4-1
ide Shot: 72-79,Ang-Rt 333.0615,Zenith 90.1950,Slp Dst 119.2800,SB4-3
ide Shot: 72-80,Ang-Rt 316.1915,Zenith 90.1020,Slp Dst 99.5200,SB4-4
ide Shot: 72-81,Ang-Rt 295.0840,Zenith 90.1020,Slp Dst 156.8400,SB4-5
Side Shot: 72-82,Ang-Rt 284.5730,Zenith 89.5945,Slp Dst 182.5600,SB4-7
ccupy: Occ 73,N 6109.8544,E 4123.3827,Elv 0.0000,P-K IN AC

Backsight: Occ 73,BS Pt 72,BS azm 181.3208,Back circle 0.0000
Note: BS point check:73-72, Horiz err: -0.010, Vert err: -0.906
Side Shot: 73-83,Ang-Rt 261.2415,Zenith 89.1010,Slp Dst 265.1000,SB5-3
Side Shot: 73-84,Ang-Rt 259.4210,Zenith 91.0920,Slp Dst 243.1200,SB5-4
Side Shot: 73-85,Ang-Rt 256.4720,Zenith 89.3525,Slp Dst 289.0600,SB5-2
Side Shot: 73-86,Ang-Rt 235.5320,Zenith 91.4730,Slp Dst 231.2400,MW 32
Note: Rt ang offset
Off Center Shot: Ang-Rt 260.5250,Zenith 90.0510,Slp Dst 373.0000
Off Center Shot: Offset len 6.0000
Side Shot: 73-87,Ang-Rt 261.4808,Zenith 90.0510,Slp Dst 373.0480,MW30
Store: Pt 3,N 6059.3472,E 5085.4140,Elv 0.0000,SPIKE WK PT
Note: BS point check:3-1, Horiz err: 0.009, Vert err: -3.506
Occupy: Occ 3,N 6059.3472,E 5085.4140,Elv 0.0000,SPIKE WK PT
Backsight: Occ 3,BS Pt 1,BS azm 184.3635,Back circle 0.0000
Side Shot: 3-88,Ang-Rt 83.0945,Zenith 91.3055,Slp Dst 191.4400,SB14-5
Side Shot: 3-89,Ang-Rt 88.1010,Zenith 91.2315,Slp Dst 192.2600,SB14-3
Side Shot: 3-90,Ang-Rt 94.3330,Zenith 91.3010,Slp Dst 178.9200,SB14-2
Side Shot: 3-91,Ang-Rt 101.1330,Zenith 90.0330,Slp Dst 206.9800,SB14-1
Side Shot: 3-92,Ang-Rt 96.3710,Zenith 89.5305,Slp Dst 204.4200,SB14-4
HI / HR : Inst H 0.0000,Rod H 0.6500
Note: BS point check:3-1, Horiz err: 0.004, Vert err: -4.362
Occupy: Occ 3,N 6059.3472,E 5085.4140,Elv 0.0000,SPIKE WK PT
Backsight: Occ 3,BS Pt 1,BS azm 184.3635,Back circle 0.0000
Side Shot: 3-93,Ang-Rt 97.3630,Zenith 90.0035,Slp Dst 187.5250,MW 15

SURVEY BY PYRAMID ENGINEERS AT NEVADA AIR GUARD FACILITY

WELL #	GROUND ELEV. FT. AMSL	CASING ELEVATION FT. AMSL	
MW7	4398.26	4397.91	OLDER WELL
MW15	4403.23	4402.75	OLDER WELL
MW18	4402.93	4402.58	OLDER WELL
MW28	4404.30	4404.03	NEW WELL
MW29	4404.32	4404.05	NEW WELL
MW30	4404.72	4404.48	NEW WELL
MW32	4402.12	4401.89	NEW WELL

AIRGUARD.CRS

HAVITIES TO MONITOR WELL [illegible] PT 1 [illegible]

ACPT #1 BS PT #2		
D	00-00-00	881.416
R	179-59-15	881.465
HA	94-36-35	
#3 D	94-36-35	1062.785
R	274-36-20	1062.785
FIRST TO PO PT # - 50		
#52	SB 7-11? SHOT CONC. PLUG [illegible]	
#53	SB-7-10? SHOT HOLE	
#54	SB-7-4 CONC. PLUG [illegible] MARK #1	
#56	HOLE FILLED W/ AC	
#58	" " "	
#59	" " "	
#60	" " "	
#63	IS T-1	
#65	SHOT CNTR. 2 [illegible] AC	
PT #66 TEMP MK PT		
#67	CONC. PLUG W/LATH SB 7-10	
#68	CO. RD. HILL #6 OR #9 IN GRAVEL GOOD ONE	
#69	TENT PEG IN GRAVEL	
#70	" " IN CONC. FILLED HOLE	

SHOTS 50-71 ARE SITE #7

05-27-76

NUV-SUV

GTS-3B #Q30171

VERT. CIRCLE INDEXED

PPM CHANGED FROM +10 TO +40 SEM

SET SPIKE

[illegible] CREEK

[illegible] WASH

DIRT AREA #3

FUEL TANK AREA

FLIGHT LINE

NATIONAL GUARD [illegible] SET SPIKE

#2

SET SPIKE

#1

MAG BKG SET 1-2

DUE WEST

AIRGUNRD

AZ @ PT #2 BS PT #1

D 000-00-00 2881.4(m)

R 179-59-15

HR 270-11-00

#72 D 266-11-00 2666.1(m)

R 26-10-45

D 00-00-00 [illegible]

R 179-59-45

HR 270-15-00

#73 D 270-15-00 1101.[illegible]

R 90-01-15 1101.[illegible]

AZ PT #72 BS PT #73

74 : MH #29

76 DIRT W/TENT PEG

77 " #1

78 " 74-82.

79

80

81

82 FLO-X IN GRASS. [illegible]

SET SPIKE FOR TEMP CONTROL [illegible]

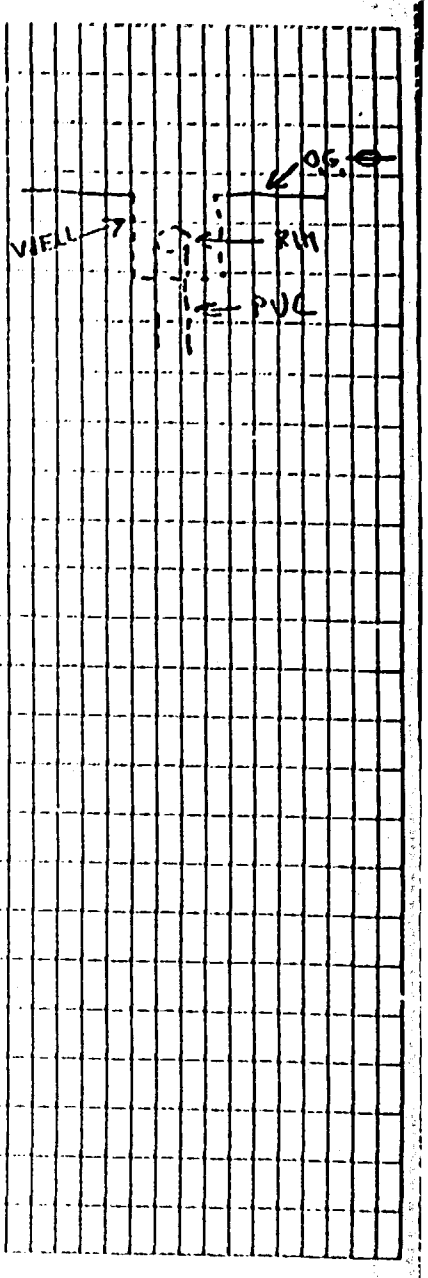
AIRGUARD CKS

LEVELS

PT"	BS	HI	FS	ELEV	Adj. Elev.	REMARKS
MW-7	6.22	4404.10	10.01	1397.90	1397.90	N.RIM 2" PVC
" "			5.82	1398.28	1398.26	N.RIM @ O.G.
T-1			4.615	1399.49	1399.50	T-1 N.RIM 2" PVC
T-1			4.35	1399.75	1399.76	" " O.G.
T-2			4.825	1399.28	1399.29	T-2 N.RIM 2" PVC
T-2			4.60	1399.50	1399.51	" " O.G.
MW-31			5.60	1398.50	1398.51	N.RIM 2" PVC
" "			5.37	1398.73	1398.71	" " @ O.G.
T-3			5.11	1398.99	1399.00	T-3 N.RIM 6" PVC
T-3			4.77	1399.33	1399.31	" " @ O.G.
T-4			5.79	1398.31	1398.32	N.RIM 2" PVC
T-4			5.54	1398.56	1398.57	" " O.G.
T.P.			(4.09)	1400.01	1400.02	
	7.22	4407.23				
T.P.			(2.90)	1401.32		
	4.72	4409.05	10.02			
MW-29			5.02	1404.03	1404.05	N.RIM 2" PVC
"			4.75	1404.30	1404.32	N.RIM O.G.
MW-28			5.01	1404.01	1404.03	N.RIM 2" PVC
" "			(4.77)	1404.28	1404.30	" " O.G.
	4.78	4409.06				
T.P.			(4.325)	1404.74		
	5.325	4410.06				

CONT NEXT PG

PAGE 73



PT#	BS	HI	FS	ELEV		REMARKS
MW-32		4410.06	8.20	4401.86	4401.89	N RIM 2" PVC
" "			7.97	4402.09	4402.12	" " O.G
TP	~~6.02~~		6.02	4404.01		SLEDGE IN GROUND
	5.42	4409.46	+0.03			
MW-30			5.01	4404.45	4404.48	N RIM 2" PVC
" "			4.77	4404.69	4404.72	" " O.G
MW-15			6.74	4402.72	4402.75	N RIM 2" PVC
" "			6.26	4403.26	4403.23	" " O.G
MW-18			6.91	4402.55	4402.58	N RIM 2" PVC
" "			6.56	4402.90	4402.93	" " O.G
T.P.	6.45		6.445	4403.02	4403.05	
	3.46	4406.48				
T.P.			6.28	4400.20		
	3.74	4403.94				
MW-7			6.08	4397.80	~~4397.90~~	N. RIM 2" PVC
				above = 0.04'		
	40.885		40.91			
Holding MW-7 Elev.						
MW 15 Record			4402.77	Diff = 0.02		
Mean			x 4402.75			
MW 18 Record =			4402.57	Diff = 0.01		
Mean =			4402.58			

BASIS OF COORDINATES

THE BASIS OF COORDINATES FOR THIS SURVEY IS BASED UPON HOLDING THE PREVIOUS COORDINATE VALUES FOR MONUMENT [illegible] AND THE BEARING TO [illegible] AS SHOWN ON [illegible]

BASIS OF ELEVATIONS

THE BASIS OF ELEVATIONS FOR THIS SURVEY IS MONITOR WELL MW-[illegible], ELEVATION= [illegible].

SITE 5

SITE 14

SITE 4

SITE 7

SCALE 1"=60'

GRAPHIC SCALE

LEGEND

- MONITOR WELL
- SURVEY POINT
- SURVEY CONTROL POINT

NOTES

1. BASIS SHOWN ON THIS MAP IS BASED UPON A FIELD SURVEY CONDUCTED BY PYRAMID ENGINEERS AND LAND SURVEYORS, ELEVATIONS WERE DETERMINED BY DIFFERENTIAL LEVELS ON A CLOSED LOOP.

PYRAMID Engineers & Land Surveyors, Inc.

Monitor Well Survey
FOR
ERM West
at Nevada Air National Guard Facility

1

95072

PYRAMID Engineers & Land Surveyors
330 Crampton St. • Reno, Nevada 89502
(702) 329-2540 • FAX (702) 329-2768

Thomas J. Gribbin, P.L.S., President
James E. Arden, P.E., Principal
J. Ric Adler, P.E., Associate
Patrick E. Fritchel, P.E., Associate
Melissa J. Lindell, AICP, Associate
Michael J. Miller, P.L.S., Associate

July 31, 1995
File No. 95072

RECEIVED
AUG - 7 1995
ERM-WEST INC.
PHOENIX, AZ.

ERM West, Inc.
Attn: Robin Weesner
5111 North Scottsdale Road, Suite 108
Scottsdale, AZ 85230

RE: Nevada Air National Guard Monitor Well Survey

Dear Ms. Weesner:

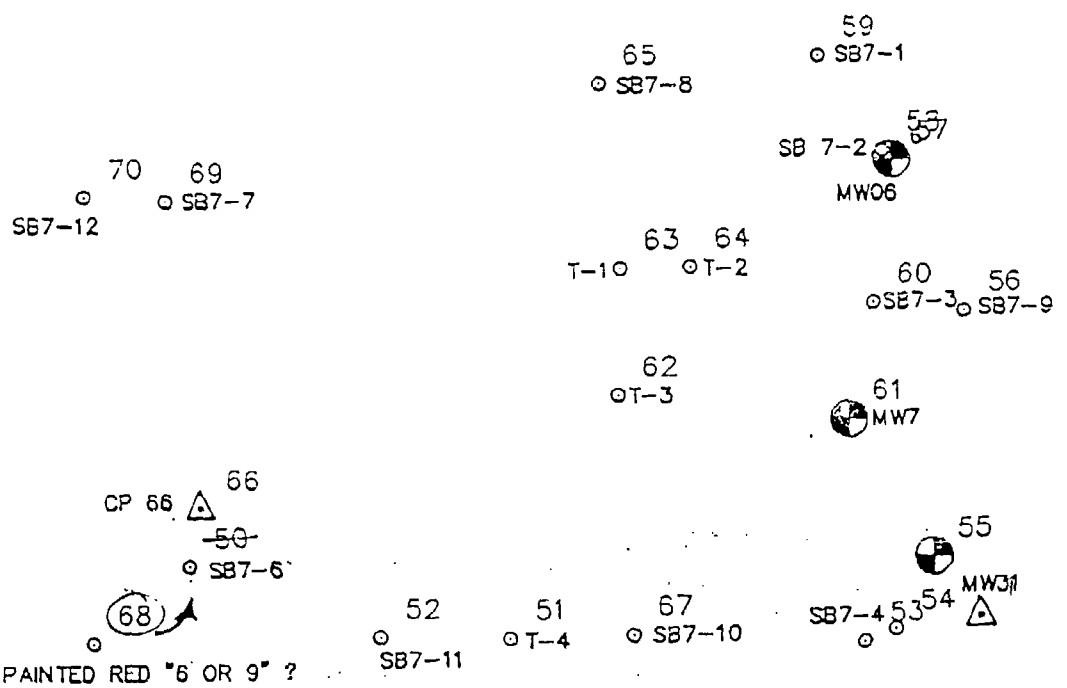
This note is in reference to your facsimile dated July 25, 1995 reguarding a problem with Point Number 50. I visited the site to investigate the problem and discovered SB7-6 was incorrectly marked as Point Number 50. It should have been labeled Point Number 68. The initial field crew noted a porblem reading labels on the asphault due to weathering. I hope this will clarify the data. Please let me know if I can answer any other questions.

Sincerely,
PYRAMID Engineers & Land Surveyors, Inc.

Michael J. Miller, P.L.S.
Associate

MJM/lsc

SITE 7


59
SB7-1
65
SB7-8
SB 7-2
MW06
70
69
SB7-7
SB7-12
63
64
T-10
T-2
60
SB7-3
56
SB7-9
62
T-3
61
MW7
66
CP 66
50
SB7-6
55
MW3
68
52
51
67
SB7-4
53
54
T-4
SB7-10
SB7-11
PAINTED RED "6 OR 9" ?

APPENDIX E

CHAIN-OF-CUSTODY RECORDS

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

16289

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: Reno, NV

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature)
Courier: Fedex

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E
1	TB051295-1	05/12/95	0810	X					2			X		
2				X										
3	MW17-95-2	05/12/95	0925	X					7	X	X	X		X
4				X										
5	MW15-95-2	05/12/95	1140	X					7	X	X	X		X
6				X										
7	MW18-95-2	05/12/95	1305	X					7	X	X	X		X
8				X										
9	MW18-95-2*	05/12/95	1305	X					7	X	X	X		X
10				X										
11	MW26-95-2	05/12/95	1435	X					7	X	X	X		X
12				X										
13	MW26-95-2*	05/12/95	1436	X					7	X	X	X		X
14				X										

Relinquished by Sampler: (Signature) — Date: 05/14/95 — Time: 1612
Relinquished by: (Signature) — Date: 5/14/95 — Time: 1139
Received by: (Signature) — Received by Laboratory: (Signature)
Relinquished by: (Signature) — Received by: (Signature)

Remarks: Sales Order #15766

Requested Turnaround: NORMAL

Special Detection Limits: QC Package:

confirm all VOC detects by 8240

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM W
CONTACT: Ms. Robin Meissner
PROJECT: RI/FS NVAN6
CARRIER: Fed Ex
DATE RECEIVED: 1995 MAY 13 AM 11:35
UNPACKED STAMP: 1995 MAY 13 PM 1:25
DATE SHIPPED: 5/12/95
UNPACKED BY: AP
NUMBER OF KITS RECEIVED: 2
GROUP# 16279 B.O.# 6066

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
686	yes	C NO	NO	2°C	12
		B NO	NO		
44	yes	C NO	NO	1°C	32
		B NO	NO		
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY

PRESERVATIVES CHECKED YES ✓ NO _____ SEE ABOVE NOTES _____
(Water only)

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

GSAI EMPLOYEE _____ DATE: _____

6 HNO3 12 HCL ☐ H2SO4 ☐ NAOH 12 Na2S2O3 12 NEAT ☐ OT/PRE.

(Water Only)

12 VOA
12 OTHER

12 VOA
_ OTHER

Remaining Samples in Group _____

Project Manager _____

# Cont.	Mtrx.
44	Wa
Total 44	

S.A. 152.06/April 10, 1995

5409500224

5409500224

1784-9535-6 05-12-95

Robin Weesner 602-990-9350 LORA DUNLAP 713-990-4444

EPM WEST INC

5111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

GULF STATES ANALYTICAL INC.

6310 ROTHWAY

HOUSTON TX 77040

COC 1 of 2 COC included

X

1155-0512-2

150

X 150

AP 5-13-95

REVISION DATE 4/94

160

5409500235

5409500235

1784-9535-6 05-12-95

602-990-9350 LORA DUNLAP 713-990-4444

EPM WEST INC

5111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

GULF STATES ANALYTICAL INC.

6310 ROTHWAY

HOUSTON TX 77040

COC 2 of 2

X

1155-0512-2

160

X 160

AP 5-13-95

REVISION DATE 4/94

160

16291

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NVANG, Reno

Project Name: RI/FS NVANG
P.O./Project Number: 6001-31

Sampler(s) Name: (Signature)

Courier: Fedex

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	MS/MSD requested
1	TB051395-1	05-13-95	0745	X					2			X			
2				X											
3	MW27-95-2	05-13-95	0905	X					7	X	X	X	X		X
4				X											
5	MW08-95-2	05-13-95	0855	X					7	X	X	X	X		X rqw
6				X											
7	MW06-95-2	05-13-95	1100	X					7	X	X	X	X		
8				X											
9	MW06-95-2*	05-13-95	1100	X					7	X	X	X	X		
10	MW25-95-2	05-13-95	1335	X					7	X	X	X	X		
11				X											
12	MW07-95-2	05-13-95	1435	X					7	X	X	X	X		
13	MW07-95-2*	05-13-95	1436	X					7	X	X	X	X		
14				X											

Relinquished by Sampler: (Signature) — Date: 05-12-95 — Time: 1610

Relinquished by: (Signature) — Date: 5/15/95 — Time: 8:45

Relinquished by: (Signature) — Date: — Time:

Received by: (Signature) — Fedex

Received by Laboratory: (Signature) — Monica Reyes

50 540950021 3

Remarks:
Sales Order #15766
Lead unfiltered ex. MW-25-95-2
MW07-95-2

Requested Turnaround:
NORMAL

Special Detection Limits:

QC Package:
Confirm all 8010/8020 detects w/8240

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM-West Inc. CONTACT: Robin Weesner

PROJECT: RI/FS NVAng CARRIER: Fedex

DATE RECEIVED: ~~1995 MAY 15 AM 8:45~~ UNPACKED STAMP: 1995 MAY 15 AM 9:08

DATE SHIPPED: 5/15/95 UNPACKED BY: M. Reyes

NUMBER OF KITS RECEIVED: 2 GROUP# 11629 B.O.# 60166

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
602	YES	C No	ND	3 °C	42
		B NO	NO		
267	YES	C No	ND	4 °C	9
		B NO	NO		
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
MW07-95-2	all	begin ph was 6 added 2 ml HNO3 end ph 2
MW25-95-2	all	" begin ph was 6 added 2 ml HNO3 end ph 2

PRESERVATIVES CHECKED YES ✓ NO _____ SEE ABOVE NOTES _____
(Water only)

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

GSAI EMPLOYEE _____ DATE: _____

☒ 7 HNO3 ☒ 16 HCL ☐ H2SO4 ☐ NAOH ☒ 14 Na2S2O3 ☒ 14 NEAT ☐ OT/PRE.

(Water Only)

16 VOA
_ OTHER

28

14 VOA
_ OTHER

# Cont.	Mtrx.
51	WG
Total 51	NA

Remaining Samples in Group _____

Project Manager _____ _____

5409500202

5409500202

1784-9535-6 05-13-95

Robin G Weesner 602-990-9350 LORA ILNLAP 713-990-4444

BFM WEST INC GULF STATES ANALYTICAL INC.

7111 N SCOTTSDALE RD STE 108 6310 RETHWAY

SCOTTSDALE AZ 85250 HOUSTON TX 77074

4001 H/Cooler 10 of 2 (cancelled)

1155-0512-2

X X 159

☐ 159

5-15-95

REVISION DATE 4/94

160

5409500213

5409500213

1784-9535-6 05-13-95

Robin G. Weesner 602-990-9350 LORA ILNLAP 713-990-4444

BFM WEST INC GULF STATES ANALYTICAL INC.

7111 N SCOTTSDALE RD STE 108 6310 RETHWAY

SCOTTSDALE AZ 85250 HOUSTON TX 77074

4001 Cooler 2 of 2

1155-0512-2

X X

☐ 175

5-15-95

REVISION DATE 4/94

160

16304

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: Reno NV

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature) Robin Weesner, David A. Batts
Courier:

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E
1	TB051495-1	05/14/95	0925	X					2			X		
2				X										
3	MW23-95-2	05/14/95	1045	X					7	X	X	X		X
4				X										
5	MW03-95-2	05/14/95	1200	X					7	X	X	X		X
6				X										
7	MW10-95-2	05/14/95	1315	X					7	X	X	X		X
8				X										
9	MW10-95-2*	05/14/95	1316	X					7		X	X		X
10				X										
11				X										
12				X										
13				X										
14				X										

Relinquished by Sampler: (Signature) Robin Weesner — Date: 05/15/95 — Time: 1430
Received by: (Signature) FEDEX

Relinquished by: (Signature) Shipped Bill 540943479 6 — Date: — Time: 853
Received by Laboratory: (Signature) [illegible] 5-16-95

Relinquished by: (Signature) — Date: 5/16/95 — Time:

Remarks: Sales Order #15766
Vote: MW10-95-2* has no lead Sample we knew

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM - West
CONTACT: Robin Weesner
PROJECT: RI/FS AP NIAGO
CARRIER: Fedx
DATE RECEIVED: 1995 MAY 16 AM 8:53
UNPACKED STAMP: 1995 MAY 16 AM 11:18
DATE SHIPPED: 5/15/95
UNPACKED BY: AP
NUMBER OF KITS RECEIVED: 1
GROUP# 16304 B.O.# 6066

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
426	Yes	C Yes	Yes	3°C	29
		B NC	NC		
		C			
		B			
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
MW-10-95-2#	Metals	not in cooler

PRESERVATIVES CHECKED YES ✓ NO _____ SEE ABOVE NOTES _____
(Water only)

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

GSAI EMPLOYEE _____ DATE: _____

☒ 3 HNO3 ☒ 8/10 HCL AP ☐ H2SO4 ☐ NAOH ☒ 8 Na2S2O3 ☒ 8 NEAT ☐ OT/PRE.
(Water Only)

10 VOA
1L OTHER

8 VOA
R 8 OTHER

# Cont.	Mtrx.
29	Wa
Total 29	

Remaining Samples in Group _____

Project Manager _____

5409434796

5409434796

05/15/95

Robin Weesner 602-990-9350 LORA DUNLAP 713-690-4444

ENVIRONMENTAL TEST INC GULF STATES ANALYTICAL INC.

8111 N SCOTTSDALE RD STE 108 5310 POTHWAY

SCOTTSDALE AZ 85253 HOUSTON TX 77041

COC,31 — Cooler 1 of 1 (COC inside)

1155-0512-2

153

5-16-95

REVISION DATE 4/94

160

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/15 Houston

Name/Company

Seal broken by

Date 5-16-95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time

Name/Company

Seal broken by

Date 5-16

5/15

GP 16331

1.00, pg 1 of 2

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NVANG SITE 4

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature) Dan A Batts / M R Buck

Courier: Federal Express

Relinquished by: (Signature) Dan A Batts
Relinquished by: (Signature) Airbill No. 540850019 1
Relinquished by: (Signature)
Received by: (Signature) FEDEX
Received by: (Signature)
Received by Laboratory: (Signature) 5/17/95 9:24 am

Request for Analysis

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E	
TB051695-1	5-16-95	0830	X					2	X			
~~SB4-1-1.5~~		0945		X				1	X	X	X	rgw
SB4-1-3.5		1000		X				1	X	X	X	
SB4-1-5.5		1015		X				1	X	X	X	
SB4-1-9.5		1035		X				1	X	X	X	
SB4-1-9.5 *		1035		X				1	X	X	X	
~~SB4-6-1.5~~		1130		X				1	X	X	X	rgw
SB4-6-5.5		1145		X				1	X	X	X	
~~SB4-6-7.5~~		1200		X				1	X	X	X	rgw
SB4-6-10.0	✓	1205		X				1	X	X	X	
SB4-6-11.5		1225		X				1	X	X	X	
~~SB4-5-1.5~~		1415		X				1	X	X	X	rgw
~~SB4-5-3.5~~		1425		X				1	X	X	X	rgw
SB4-5-5.5	✓	1440		X				1	X	X	X	

Remarks: Sales Order #15749 Please analyze sample and advise prior by towards tube end

Requested Turnaround: NORMAL

redline means sample not in shipment

Special Detection Limits: QC Package:

14 total soil samples

16331 Page 2 of 2

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NVANG SITE 4

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature) Dirk Gotts / Kurt Bank

Courier: Federal Express

Relinquished by Sampler: (Signature) Dirk Gotts
Relinquished by: (Signature) Kurt Bank
Date: 05/17/95
Time: 1520
Relinquished by: (Signature) Airbill No. 5409500911
Date:
Time:

Received by: (Signature) FEDEX
Received by: (Signature) Yalanda Williams
Received by Laboratory: (Signature) [illegible]
Date: 05/18/95
Time: 9:20

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Request for Analysis: TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
SB4-5-7.5	5-16-95	1500		X				1	X	X	X
SB4-5-9.0		1510		X				1	X	X	X
~~SB4-4-1.5~~		~~1530~~		X				1	X	X	X
~~SB4-4-3.5~~		~~1545~~		X				1	X	X	X
SB4-4-5.5		1600		X				1	X	X	X
SB4-4-7.5		1610		X				1	X	X	X
SB4-4-9.0		1620		X				1	X	X	X
SB4-4-9.0*		1610		X				1	X	X	X
SB4-4*		1640	X					6	X	X	X

Remarks: Sales Order #15749 Please analyze sample end w/narrow painting windows tube cut
Requested Turnaround: NORMAL
Special Detection Limits:
QC Package: 14 total Soil samples

replace means samples not

16351

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: Pole 4, Reno NV

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature) Robin C. Weesner
Steven R. Backe

Courier:

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	Request OSM/SOW
1	TB 051795-1	5/17/95	—	X					2			X			
2	SB-4-3-1.5	05/17/95	0845	X	X				1		X		X	X	
3	SB-4-3-3.5	05/17/95	0900	X	X				1		X		X	X	
4	SB-4-3-5.5	05/17/95	0905	X	X				1		X		X	X	
5	SB-4-2-2.0	05/17/95	0940	X	X				1		X		X	X	X
6	SB-4-2-3.5	05/17/95	1000	X	X				1		X		X	X	rgw
7	SB-4-2-5.5	05/17/95	1010	X	X				1		X		X	X	
8	SB-4-2-7.5	05/17/95	1020	X	X				1		X		X	X	
9	SB-4-7-1.5	05/17/95	1115	X	X				1		X		X	X	
10	SB-4-7-3.5	05/17/95	1120	X	X				1		X		X	X	rgw
11	SB-4-7-5.5	05/17/95	1130	X	X				1		X		X	X	
12	SB-4-7-7.5	05/17/95	1141	X	X				1		X		X	X	
13				X											
14	SB-4-7X	05/17/95	1200	X					6		X		X	X	

Relinquished by Sampler: (Signature) — Date: 5/17/95
Relinquished by: (Signature) FED BILL US 5409 5001 80 — Date: — Time:
Relinquished by: (Signature) — Date: — Time:
Received by Laboratory: (Signature) — Received by: (Signature) FEDEX
Relinquished by: (Signature) — Date: 05/18/95 — Received by: (Signature)

Remarks: Sales Order #15766
Please analyze Samples and w/ arrow
purity hoards tube cut

Requested Turnaround: NORMAL

Special Detection Limits: QC Package:

Red lined samples were removed from sample batch

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM-West, Inc. CONTACT: Ms. Robin Weisnen

PROJECT: RI/FS NVANG CARRIER: Fedex

DATE RECEIVED: 1995 MAY 18 AM 9:29 UNPACKED STAMP: MAY 18 AM 10:00

DATE SHIPPED: 05/17/95 UNPACKED BY: L. Williams

NUMBER OF KITS RECEIVED: 2 GROUP# 1633 B.O.# 60616

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
520	yes	C yes	yes	2°C	20 22
		B NO	NO		
803	yes	C yes	yes	2°C	17
		B NO			
		C			
		B			

C = COOLER B = BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
SB-4-7-1.5	[illegible]	[illegible]
SB-4-7-3.5	[illegible]	[illegible]
ALL	[illegible]	[illegible]

PRESERVATIVES CHECKED YES ____ NO X SEE ABOVE NOTES ____
(Water only)

ACTION TAKEN

PERSON CONTACTED: Robin Weisner DATE: 5/19/95

RESOLUTION go ahead with SB-4-7-3.5, SB-4-7-1.5 not recvd.

GSAI EMPLOYEE ____ DATE: ____

☐ HNO3 ☒ 8 HCL ☐ H2SO4 ☐ NAOH ☒ 4 Na2S2O3 ☒ 4 NEAT ☐ OT/PRE.

(Water Only)

8 VOA
__OTHER

4 VOA
__OTHER

Remaining Samples in Group ____

Project Manager ____

# Cont.	Mtrx.
16	WA
23	SO
Total 39	

EAGLE EP PICHER
ENVIRONMENTAL SCIENCE
& TECHNOLOGY DEPT.
200 B.J. TUNNELL BLVD. MIAMI, OK 74354
1-800-331-7425

Specially Cleaned
Sample Container

Lot #:

DATE: | TIME: | COLLECTED BY:

SAMPLING SITE

SAMPLE TYPE:
☐ Grab ☐ Composite ☐ Other

TESTS REQUIRED:

PRESERVATIVE



EAGLE EP PICHER
ENVIRONMENTAL SCIENCE
& TECHNOLOGY DEPT.
200 B.J. TUNNELL BLVD. MIAMI, OK 74354
1-800-331-7425

Specially Cleaned
Sample Container

Lot #:

DATE: | TIME: | COLLECTED BY:

SAMPLING SITE:

SAMPLE TYPE:
☐ Grab ☐ Composite ☐ Other

TESTS REQUIRED:

PRESERVATIVE



EAGLE EP PICHER
ENVIRONMENTAL SCIENCE
& TECHNOLOGY DEPT.
200 B.J. TUNNELL BLVD., MIAMI, OK 74354
1-800-331-7425

Specially Cleaned
Sample Container

Lot #:

DATE: | TIME: | COLLECTED BY:

SAMPLING SITE:

SAMPLE TYPE:
☐ Grab ☐ Composite ☐ Other

TESTS REQUIRED:

PRESERVATIVE



EAGLE EP PICHER
ENVIRONMENTAL SCIENCE
& TECHNOLOGY DEPT.
200 B.J. TUNNELL BLVD. MIAMI, OK 74354
1-800-331-7425

Specially Cleaned
Sample Container

Lot #:

DATE: | TIME: | COLLECTED

SAMPLING SITE:

SAMPLE TYPE:
☐ Grab ☐ Composite ☐ Other

TESTS REQUIRED:

PRESERVATIVE



5409500180

5409500180

1784-9535-6

5/17

Robin Weesner

602-990-9350

ESN WEST INC

9111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 8 5 2 5 C

LORA DUNLAP 713-690-4444

GULF STATES ANALYTICAL INC.

6310 ROTHWAY

HOUSTON TX 7 7 0 4 C

COC: Cooler # 2 of 2 COC enclosed

1155-0512-2

150

150

Lalonn Williams

05/18/95

REVISION DATE 4/94

160

5409500191

5409500191

1784-9535-6

05/17/95

Robin Weesner

602-990-9350

ESN WEST INC

9111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 8 5 2 5 C

LORA DUNLAP 713-690-4444

GULF STATES ANALYTICAL INC.

6310 ROTHWAY

HOUSTON TX 7 7 0 4 C

COC: Cooler # 1 of 2 C-of-C enclosed

1155-0512-2

160

160

Lalonn Williams

05/18/95

REVISION DATE 4/94

160

Whole group - LAB CLP-pkg

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

16363

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: Site 7

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature) Steven R. Becker

Courier: Fedex

Request for Analysis

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
TB051995-1	5/19/95	—	X					2		X	
~~SB7-1-2~~	05/19/95	0944		X				1	X	X	X
SB7-1-3.5	05/19/95	1000		X				1	X	X	X
~~SB-7-1-5.5~~ rpw SB-7-1-5.5	05/19/95	1005		X				1	X	X	X
SB-7-1-7.5	05/19/95	1010		X				1	X	X	X
~~SB7-2-1.5~~	05/19/95	1030		X				1	X	X	X
SB7-2-3.5	05/19/95	1040		X				1	X	X	X
SB7-2-3.5*	05/19/95	1040		X				1	X	X	X
SB7-2-5.5	05/19/95	1045		X				1	X	X	X
SB7-2-7.5	05/19/95	1055		X				1	X	X	X

Relinquished by Sampler: (Signature) — Date: 05/19/95 Time: 1606
Relinquished by: (Signature) — Date: — Time: —
Relinquished by: (Signature) — Date: 5/20/95 Time: 1642
Received by: (Signature) — Date: — Time: —
Received by: (Signature) — Date: — Time: —
Received by Laboratory: (Signature) — Date: 5/20/95 Time: 1642

R Weesner

R. Weesner

Remarks: Sales Order #15749

Crossed out samples removed from cooler rgw

Requested Turnaround: NORMAL

Special Detection Limits: QC Package: Lab Package- CLP requested

C600039

16424

CLP Package requested for all samples

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

60000

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NUANG

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature) Nevine Melikian, Dave Bell

Courier: Federal Express

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548	Purge Aromatics/Halocarbons, GC (8010/8020) 0558	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	Validation Package
1	MW05-95-2	5/24/95	1513	X					7	X	X	X		X	X
2	MW29-95-2	"	1635	X					7	X	X	X		X	X
3	MW29-95-2*	"	1635	X					7	X	X	X		X	X
4	MW28-95-2	"	1755	X					7	X	X	X		X	X
5	TB052495-1	"	1513	X					2			X			X
6				X											
7				X											
8				X											
9				X											
10				X											
11				X											
12				X											
13				X											
14				X											

Relinquished by: (Signature) — Date: 5/24/95 Time: 15:00
Relinquished by Sampler: (Signature)

Relinquished by: (Signature) — Date: 5/26/95 Time: 9:00
Received by: (Signature)

Received by: (Signature) — Date: 5/26/95 Time: 9:00
Received by Laboratory: (Signature)

Federal Express 5409434811

Remarks: Sales Order #15766

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.

6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis 16385

Company: ERM-West, Inc.	Phone No: 602-990-9350
	Fax No: 602-990-0107
Reports Sent To: Ms. Robin Weesner	Project Location: Site 7
Project Name: RI/FS NVANG	P.O./Project Number: 6001
Sampler(s) Name: (Signature) Steve Becker	
Courier: Federal Express	

Relinquished by Sampler: (Signature) — Date: 5/22/95 — Time: 1446

Relinquished by: (Signature) — Date: — Time:

Relinquished by: (Signature) — Date: 5/23/95 — Time: 1048

Received by: (Signature) — Received by: (Signature) Federal Express 540950154

Received by Laboratory: (Signature) Lolla Moore

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL,Soil OLM01 List (8270) 1201E	
TB052095-1	5/20/95	—	X					2		X		
~~SB7-5-1.0~~	~~05/20/95~~	~~0830~~		X				1	X	X	X	
SB7-5-3.5		0840		X				1	X	X	X	
SB7-5-5.5		0850		X				1	X	X	X	
SB7-5-7.5		0855		X				1	X	X	X	
SB7-6-1.5		0928		X				1	X	X	X	
SB7-6-3.5		0930		X				1	X	X	X	
SB7-6-5.5		0940		X				1	X	X	X	
SB7-7-1.5		1045 ~~1050~~		X				1	X	X	X	
SB7-7-~~3~~ 5.5		1055		X				1	X	X	X	
SB7-7-7.5		1110		X				1	X	X	X	
SB7-8-X		1205	X					6				
SB7-8-3		12:30		X				1	X	X	X	
SB7-8-5.5		12:50										

MS/MSD requested

1024

Remarks:
Sales Order #15749
15964

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

page 2 of 2

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis 10385

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location:

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature) Steve Beeko

Courier: Federal Express

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
SB7-8-5.5X	05/20/95	12:50		X					X	X	X

Relinquished by Sampler: (Signature) Steve Beeko — Date: 5/23/95 Time: 08:48

Relinquished by: (Signature) — Date: 5/24/95 Time: 1446

Received by: (Signature) Federal Express 540950015

Relinquished by: (Signature) — Date: — Time:

Received by Laboratory: (Signature) Melba Moore

Remarks: Sales Order ~~#15749~~ 15964

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM-West Inc. CONTACT: Robin Wessner

PROJECT: RI/FS NVANG CARRIER: Fed X

DATE RECEIVED: 1995 MAY 23 AM 8:48 UNPACKED STAMP: 1995 MAY 23 PM 2:58

DATE SHIPPED: 5/22/95 UNPACKED BY: M. Reyes

NUMBER OF KITS RECEIVED: 2 GROUP# 6385 B.O.# 40646

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
776	yes	C yes / B NO	yes / NO	3°c	19
89	yes	C yes / B NO	yes / NO	4°c	20
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY

PRESERVATIVES CHECKED YES____ NO____ SEE ABOVE NOTES____
(Water only)

ACTION TAKEN

PERSON CONTACTED: Robin Wessner DATE: 5/25/95

RESOLUTION SX SB7-8X, SB7-8-5.5 add all test as others listed

GSAI EMPLOYEE L Dunlap DATE: 5/25/95

☐ HNO3 ☒ 8 HCL ☐ H2SO4 ☐ NAOH ☒ 4 Na2S2O3 ☒ 4 NEAT ☐ OT/PRE.

(Water Only)

8 VOA
__OTHER

4 VOA
__OTHER

# Cont.	Mtrx.
23	SO
16	WA
Total 39	

Remaining Samples in Group _____

Project Manager _____

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
(713) 690-4444

CUSTODY SEAL

Date/Time 5/22/95 1456

Name/Company Denise Melikian ERM-West

Seal broken by

Date

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/22/95 1456

Name/Company Denise Melikian ERM-West

Seal broken by

Date 5/23/95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/22/95 1452

Name/Company Denise Melikian ERM-West

Seal broken by

Date 5/23/95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/22/95 1452

Name/Company Denise Melikian ERM-West

Seal broken by

Date 5/23/95

5409500154

1784-9535-6 5/22/95

602-990-9350 LORA DUNLAP 713-690-4444

ERM WEST INC

7111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

GULF STATES ANALYTICAL INC.

6310 ROTHWAY

HOUSTON TX 77040

8001.31 Cooler 2 of 2

X

1155-0512-2

X X

1 72

5/23/95 11AM

REVISION DATE 4/94

160

5409500143

5409500143

1784-9535-6 5/22/95

602-990-9350 LORA DUNLAP 713-690-4444

ERM WEST INC

7111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

GULF STATES ANALYTICAL INC.

6310 ROTHWAY

HOUSTON TX 77040

8001.31 Cooler 1 of 2

X

1155-0512-2

X X

1 69

1 69

5/23/95 11AM

REVISION DATE 4/94

160

Page 1 of 2. 110.385

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location:

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature) Steve Becker

Courier: Federal Express

Relinquished by Sampler: (Signature) Robin Weesner
Relinquished by: (Signature)
Relinquished by: (Signature)

Date: 5/22/95 Time: 2:45p
Date: Time:
Date: 5/23/95 Time: 08:48

Received by: (Signature) Federal Express 540950143
Received by: (Signature)
Received by Laboratory: (Signature) Yolanda Moore

Request for Analysis

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
TB052195 1	5/21/95	—	X					2		X	
SB5-2-2.5		10:50						1	X	X	X
SB5-2-3.5		10:55						1	X	X	X
~~SB5-2-5.5~~		~~11:05~~						1	X	X	X
~~SB5-2-5.5x~~		~~11:05~~						1	X	X	X
SB5-2-7.5		11:10						1	X	X	X
~~SB5-3-1.5~~		~~11:40~~						1	X	X	X
SB5-3-3.5		11:50						1	X	X	X
SB5-3-5.5		11:55						1	X	X	X
SB5-3-7.5		12:00						1	X	X	X
~~SB5-4-1.5~~		~~12:25~~ ~~12:35~~						1	X	X	X
SB5-4-3.5		12:30						1	X	X	X
SB5-4-5.5		12:35						1	X	X	X
SB5-4-5.5x		12:35						1	X	X	X

Remarks:
Sales Order #~~15749~~ 15964

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

Page 2 of 2 16.385

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location:

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature)

Courier: Fedex

Request for Analysis

FIELD SAMPLE ID		Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E	
SB5-4-7.0	⊘	05/21/95	1245		X				1	X	X		
SB5-1-1.5	⊘	05/21/95	1500		X				1	X	X		X
~~SB5-1-1.5*~~ rnw SB5-1*	⊘	05/24/95	1530	X					6	X	X		

Relinquished by Sampler: (Signature) — Date: 5/24/95 Time: 2:45p
Relinquished by: (Signature) — Date: 5/24/95 Time: 08:48
Relinquished by: (Signature)
Received by: (Signature) Federal Express 540150043
Received by: (Signature)
Received by Laboratory: (Signature)

Remarks:
Sales Order #~~15749~~ 15964

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

164102 page 1 of 2

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NVANG

Project Name: RI/FS NVANG
P.O./Project Number: 6001.33

Sampler(s) Name: (Signature) Steven R. Becka

Courier: Federal express

Relinquished by: (Signature) Steven Becka — Date: 5/23/95 — Time: 1510
Relinquished by: (Signature) Sharon Bill 5409434802 — Date: 5/24/95 — Time: 09:15
Received by: (Signature) Rebecca Meece — Date: 5/24/95 — Time: 09:15
Relinquished by Sampler: (Signature) — Date: 05/23/95 — Time: 1510
Received by: (Signature) — Date: — Time:
Received by Laboratory: (Signature) — Date: — Time:

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E	MS/MSD requested
TB052295-1	5/22/95	—	X					2		X		
SB7-12-1.5		1510						1	X	X	X	
SB7-12-3.5		1515						1	X	X	X	
SB7-12-5.5		1535						1	X	X	X	
SB7-12-7.5		1540						1	X	X	X	X
SB7-12-7.5*		1540						1	X	X	X	
SB7-9-1.5	5/23/95	0820						1	X	X	X	
SB7-9-3.5		0825						1	X	X	X	
SB7-9-5.5		0830						1	X	X	X	
SB7-10-0.5		0915						1	X	X	X	
SB7-10-4.0		0920						1	X	X	X	
SB7-10-5.5		0930						1	X	X	X	
SB7-10-5.5*		0930						1	X	X	X	
SB7-10-7.0		0935						1	X	X	X	

Remarks:
Sales Order #15749
Note SB7-9-7.5 not on chain, however, this sample was not going to be submitted for [illegible]

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

16402 Page 2062

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NVANG

Project Name: RI/FS NVANG
P.O./Project Number: 6001,33

Sampler(s) Name: (Signature) Steven R. Baker

Courier: Federal Express

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8260) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
SB7-11-1.5	05/23/95	1035		X				1	X	X	X
SB7-11-3.5		1040		X				1	X	X	X
SB7-11-5.5		1050		X				1	X	X	X
SB7-11*		1100	X					6	X	X	X

Relinquished by Sampler: (Signature) Steven R. Baker
Relinquished by: (Signature) Shuppan Bill 5409438402
Date: 05/23/95 Time: 1550
Relinquished by: (Signature)
Date: 5/24/95 Time: 09:13
Received by: (Signature) FEDEX
Received by: (Signature)
Received by Laboratory: (Signature) Melba Moore

Remarks: Sales Order #15749

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM- West, Inc. CONTACT: Robin Weaner

PROJECT: RI/FS NYANG CARRIER: FedX

DATE RECEIVED: 1995 MAY 24 AM 9:13 UNPACKED STAMP: MAY 24 PM 3:02

DATE SHIPPED: 5/23/95 UNPACKED BY: MM

NUMBER OF KITS RECEIVED: 1 GROUP# 16402 B.O.# 6066

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
824	YES	C YES	YES	4 °C	22
		B NO	NO		
		C			
		B			
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
SB7-11*	semi-VOA	bottles have bottles HNO3 + NA2S2O3
	"	stickers ph 7/used metals
		label on semi-voa bottles

PRESERVATIVES CHECKED YES ✓ NO _____ SEE ABOVE NOTES _____
(Water only)

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

GSAI EMPLOYEE _____ DATE: _____

☐ HNO3 ☑ 4 HCL ☐ H2SO4 ☐ NAOH ☑ 2 Na2S2O3 ☑ 2 NEAT ☐ OT/PRE.

(Water Only)

4 VOA
_ OTHER

2 VOA
_ OTHER

Remaining Samples in Group _____

Project Manager _____

# Cont.	Mtrx.
8 & MM	WA
14	SO
Total 22	

S.A. 152.06/April 10, 1995

FedEx
Federal Express

RECIPIENT'S COPY

QUESTIONS? CALL 800-238-5355 TOLL FREE.

TRACK

5409434800

Date 5/23/95

From (Your Name) Please Print: [illegible]
Your Phone Number (Very Important): [illegible]

To (Recipient's Name) Please Print: LORA TINLAR
Recipient's Phone Number (Very Important): (713) 690-4444

Company: [illegible] WEST INC
Department/Floor No.:

Company: GULF STATES ANALYTICAL INC.
Department/Floor No.:

Street Address: 5111 N SCOTTSDALE RD STE 100

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 6310 FAIRWAY

City: SCOTTSDALE State: AZ ZIP Required: 8 5 2 5 0

City: HOUSTON State: TX ZIP Required: 7 7 0 9 2

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 6221.33 Chain Fee

IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here
Street Address:
City: State: ZIP Required:

PAYMENT 1 ☐ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
5 ☐ Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning.†)
- 11 ☒ OTHER PACKAGING
- 15 ☐ FEDEX LETTER*
- 12 ☐ FEDEX PAK*
- 13 ☐ FEDEX BOX
- 14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery.†)
- 51 ☐ OTHER PACKAGING
- 56 ☐ FEDEX LETTER*
- 52 ☐ FEDEX PAK*
- 53 ☐ FEDEX BOX
- 54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day.†)
- 30 ☐ ECONOMY**

* Economy Letter Rate not available. Minimum charge. One pound Economy rate.

Government Overnight (Restricted for authorized users only.)
- 46 ☐ GOVT. LETTER
- 41 ☐ GOVT. PACKAGE

Freight Service (For packages over 150 lbs.)
- 70 ☐ OVERNIGHT FREIGHT**, (Confirmed reservation required)
- 80 ☐ TWO-DAY FREIGHT**

† Delivery commitments may be later in some areas.
*Declared Value Limit $500
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

Weekday Service
- 1 ☐ HOLD AT FEDEX LOCATION WEEKDAY (Fill in Section H)
- ☒ DELIVER WEEKDAY

Saturday Service
- 31 ☐ HOLD AT FEDEX LOCATION SATURDAY (Fill in Section H)
- 3 ☐ DELIVER SATURDAY (Extra charge) (Not available to all locations)
- 9 ☐ SATURDAY PICK-UP (Extra charge)

Special Handling
- 4 ☐ DANGEROUS GOODS (Extra charge)
- 6 ☐ DRY ICE (Dangerous Goods Shipper's Declaration not required)
  Dry Ice 9 UN 1845 — X — kg
- ☐
- 12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6 PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	65	
Total	Total 65	Total

DIM SHIPMENT Chargeable Weight
☐ lbs
L x W x H
Enclosed
☐ Regular Stop ☐ Drop Box
☐ On-Call Stop

7 Release Signature: X

Emp. No. Date
☐ Cash Received
☐ Return Shipment
☐ Third Party ☐ Chg. To Del. ☐ Chg. To Hold
Street Address
City State Zip
Received By: X
Date/Time Received FedEx Employee No. 87

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 4/94
PART #150855 REV 4/95
FORMAT #160
160
PRINTED IN U.S.A.

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

Date/Time
Name/Co

CUSTODY SEAL

Date/Time [illegible] 05/23/95

Name/Company [illegible]

Seal broken by

Date 5-24-

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time [illegible] 05/23/95

Name/Company [illegible]

Seal broken by

Date 5-24-

16406

H6363 - 3pp

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: Site 7

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature) Steve Becker

Courier: Federal Express

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
~~SB7-3-1.5~~	05/19/95	1300		X				1	X	X	X
SB7-3-3.5	05/19/95	1316		X				1	X	X	X
SB7-3-5.5	05/19/95	1320		X				1	X	X	X
SB7-3-5.5 *	05/19/95	1320		X				1	X	X	X
SB7-3-7.5	05/19/95	1325		X				1	X	X	X
~~SB7-4-1.5~~	05/19/95	1350		X				1	X	X	X
SB7-4-3.5	05/19/95	1400		X				1	X	X	X
SB7-4-5.5	05/19/95	1405		X				1	X	X	X
SB7-4-7.5	05/19/95	1410		X				1	X	X	X
DAB-1	05/19/95	1505	X					6	X	X	X

Relinquished by: (Signature) Steve Becker — Date: 05/19/95 — Time: 1400 — Received by: (Signature) Fed Ex

Relinquished by: (Signature) Fed Ex — Date: 5/20/95 — Time: 1012 — Received by: Laboratory: (Signature) [illegible] 10:30

Relinquished by: (Signature) Skyblue Bill # 5405500176

R Weesner

R Weesner

Remarks:
Sales Order #15749

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

Crossed out Samples removed from ~~Shipment~~ Row cooler..

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM - West
CONTACT: Robin Weesner
PROJECT: RI/FS NUANG
CARRIER: FedEx
DATE RECEIVED: 1995 MAY 20 AM 10: 42
UNPACKED STAMP: 1995 MAY 20 AM 11: 15
DATE SHIPPED: 5-19-20
UNPACKED BY: AP
NUMBER OF KITS RECEIVED: 1
GROUP# ~~16363~~ 16406 B.O.# —

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
427	yes	C yes	yes	2°C	22
		B no	no		
		C			
		B			
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
all soil 5X	VOA	Subsampling required (done)
	"	

PRESERVATIVES CHECKED YES____ NO____ SEE ABOVE NOTES____
(Water only)

ACTION TAKEN

PERSON CONTACTED:____ DATE:____

RESOLUTION____

GSAI EMPLOYEE____ DATE:____

☐ HNO3 ☒ 4 HCL ☐ H2SO4 ☐ NAOH ☒ 2 Na2S2O3 ☒ 2 NEAT ☐ OT/PRE.
(Water Only)

4 VOA
2 OTHER

2 VOA
__ OTHER

# Cont.	Mtrx.
14	So
8	Wa
Total 22	

Remaining Samples in Group 5X's overlap Group 16363

Project Manager____

FedEx

5409500176

5409500176

5129M

SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER

1784-9535-6

05/19/95

From (Your Name) Please Print: Robin Weesner 602-990-9350

LORA DUNLAP (713)-690-4444

Company: ERM WEST INC

Company: GULF STATES ANALYTICAL INC.

Street Address: 5111 N SCOTTSDALE RD STE 108

Street Address: 6310 ROTHWAY

City: SCOTTSDALE State: AZ ZIP: 8 5 2 5 0

City: HOUSTON State: TX ZIP Required: 7 7 0 4 0

YOUR INTERNAL BILLING REFERENCE INFO: 6001.31 Cooler lost / Coc enclosed

IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here

Street Address:

City: State: ZIP Required:

PAYMENT: Sender [ ] X

1155-0512-2

SERVICES

Priority Overnight [X]

167 A

[ ]

167

AP 5-20-95

REVISION DATE 4/94

160

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 05/19/95

Name/Company

Seal broken by AP

Date 5-20-95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 05/19/95

Name/Company

Seal broken by AP

Date 5-20-95

16421 page 1 of 2

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107
Reports Sent To: Ms. Robin Weesner
Project Location: NVANG/Site 7
Project Name: RI/FS NVANG
P.O./Project Number: 6001.31
Sampler(s) Name: (Signature) Steve Becker
Courier: Federal Express

Request for Analysis

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) 0538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
TB052495-1	05/24/95		X					2		X	
SB14-1-3.5		1405		X				1	X	X	X
SB14-2-3.5		1525		X				1	X	X	X
SB14-2-3.5*		1525		X				1	X	X	X
SB14-2-5.5		1550		X				1	X	X	X
SB14-2*		1600	X**					5	X	X	X
SB14-3-5.5		1630		X				1	X	X	X
SB14-3-7.5		1700		X				1	X	X	X

Relinquished by Sampler: (Signature) Steve Becker
Relinquished by: (Signature) Shipped via Fed Ex Bill # 7760 5434 822
Relinquished by: (Signature)
Date: 05/25/95 Time: 1600
Received by: (Signature) FEDEX
Received by Laboratory: (Signature) Ron Tom

Remarks: Sales Order #15749
Note only one vial provided for VOA analysis for sample SB14-2*

Requested Turnaround: NORMAL
Special Detection Limits:
QC Package:

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM-West
CONTACT: Robin Weesner
PROJECT: R.I/F.S NVANG
CARRIER: Fedex
1995 MAY 26 AM 9:06
DATE RECEIVED:
1995 MAY 26 AM 9:34
UNPACKED STAMP:
DATE SHIPPED: 5/25/95
UNPACKED BY: Lalana Williams
NUMBER OF KITS RECEIVED: 2
GROUP# 16421 B.O.# 6075

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
820	Yes	C Yes	Yes	2°C	22
		B NO	NO		
404	Yes	C Yes	Yes	5°C	28
		B			
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
MW05-95-2	SV ORG	Bottle was broken when the
~~MW05-95-2~~	~~VOA~~ " "	cooler arrived
MW05-95-2	VOA	Bottle was broken
MW05-95-2	ICPMT	pH4 change to pH2

PRESERVATIVES CHECKED YES ✓ NO _____ SEE ABOVE NOTES _____
(Water only)

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

GSAI EMPLOYEE _____ DATE: _____

4 HNO3 13 HCL ☐ H2SO4 ☐ NAOH 11 Na2S2O3 12 NEAT ☐ OT/PRE.
13

(Water Only)

26 VOA
2 OTHER

VOA
OTHER

# Cont.	Mtrx.
11	WA
9	SO
Total 50	

Remaining Samples in Group 5x overlap with Group 16424
16441

Project Manager LRM for Lora

S.A. 152.06/April 10, 1995

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/25/95 4:37

Name/Company Nelia Alicia ERM-West

Seal broken by

5/26/95
Date

LW 5/25/95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/25/95 4:37

Name/Company ERM-West Nelia Alicia

Seal broken by

5/26/95
Date

LW 5/25/95

5409434822

5129M 5409434822

1784-9535-6 05/25/95

Robin Weeres 602-990-9350 LORA DUNLAP 713-690-44

EPM WEST INC

5111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

GULF STATES ANALYTICAL INC.

3310 BETHWAY

HOUSTON TX 77064

8001.31 Cooler #1 of 2 COC included

X

1155-0512-2

X

☐ 160

REVISION DATE 4/94

160

LW 5/25/95

5409434811

5129M 5409434811

1784-9535-6 5/25/95

Robin Weeres 602-990-9350 LORA DUNLAP 713-690-44

EPM WEST INC

5111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

GULF STATES ANALYTICAL INC.

3310 BETHWAY

HOUSTON TX 77064

8001.31 Cooler 2 of 2

X

1155-0512-2

X

☐ 158

REVISION DATE 4/94

160

LW 5/24/95

GULF STATES ANALYTICAL, INC.

ADDITIONAL
INCONSISTENCIES

16421

SAMPLE	PARAMETER	INCONSISTENCY
SBH	VOA	The HCl is marked out on the bottle

SAMPLE	PARAMETER	INCONSISTENCY

SAMPLE	PARAMETER	INCONSISTENCY

SAMPLE	PARAMETER	INCONSISTENCY

Validated By _____ Project Manager LRM for Lora
10/92

White Cooler 16434 1 of 1

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Request for Analysis

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NVANG

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature) DAVID BETTS, Steven R. Berlin
Courier: Federal Express

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548	Purge Aromatics/Halocarbons, GC (8010/8020) 0522	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List 8270 0923E	
1	TB052595-2	5/25/95		X					2			X			
2	MW24-95-2	"	1530	X					7		X	X	X	X	
3	MW24-95-2*	"	1535	X					7		X	X	X	X	
4	MW30-95-2	"	1330	X					7		X	X	X	X	X
5	MW30-95-2*	"	1335	X					7		X	X	X	X	
6				X											
7				X											
8				X											
9				X											
10				X											
11				X											
12				X											
13				X											
14				X											

Relinquished by: (Signature) David A. Betts — Date: 5/26/95 — Time: 0900
Relinquished by Sampler: (Signature) — Date: 5/26/95 — Time: 0900
Received by: (Signature) Federal Express 540943486 — Date: 5/27/95 — Time: 9:10
Relinquished by: (Signature) — Date: — Time:
Received by Laboratory: (Signature) — Date: — Time:

Remarks: Sales Order #15766

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

19 more samples for Sample ID TB052595-2 (Picked blocks) DSL/SL

pH

Red Cooler

16434

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: 1

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature) DAVID BETTS

Courier:

Request for Analysis

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	8010/8020 VOC/BTEX	TOTAL METALS (Cd, Cr, Cu, Pb, Ni, Zn)
1	MW04-95-2	5/25/95	1125	X					7							
2	MW32-95-2	"	935	X					7							
3	TB052595-1	"		X					2							
4	MW31-95-2	"	1645	X					7							
5	BAKER TANK # P4211	5/26/95	0845	X					5		X				X	X
6				X												
7				X												
8				X												
9				X												
10				X												
11				X												
12				X												
13				X												
14				X												

Relinquished by Sampler: (Signature) David K. Betts — Date: 5/26/95 Time: 0540

Relinquished by: (Signature) — Date: — Time:

Relinquished by: (Signature) — Date: 5/27/95 Time: 11:19

Received by: (Signature) Federal Express 540943484

Received by: (Signature) — Date: — Time:

Received by Laboratory: (Signature) Pallavi Uttam

Remarks: Sales Order #15766

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM - West
CONTACT: Ms. Robin Weesner
PROJECT: ~~SWMU-R~~ RI/FS NVANG
CARRIER: Fedex
DATE RECEIVED: 1995 MAY 27 AM 11:19
UNPACKED STAMP: 1995 MAY 27 AM 11:39
DATE SHIPPED: 5/26/95
UNPACKED BY: Lalania Williams
NUMBER OF KITS RECEIVED: 3
GROUP# 16434 B.O.# LOC67

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
768	Yes	C Yes	Yes	1°C	28
		B NO	NO		
757	Yes	C Yes	Yes	2°C	30
		B NO	NO		
Small blue + white	NO	C Yes	Yes	3°C	4
		B NO	No		

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
MW31-95-2	ICPMT	pH<4 added 1ml of HNO3 pH<2
SB7T-4	(1) VOA " "	Didn't have a COC
SB7T-3	(1) VOA	Didn't have a COC

PRESERVATIVES CHECKED YES ✓ NO _____ SEE ABOVE NOTES _____
(Water only)

ACTION TAKEN

PERSON CONTACTED: Nevine DATE: 5/31/95

RESOLUTION SB7T-4 & SB7T-3 came in a 3rd blue cooler, SA received no COC analyze GC fingerprint Method 8000 (Product) LRM Run identical parameters on ex MW04-92-2, MW32-95-2 and MW31-95-2 as listed on ex MW-24-95-2. Run 8010/8020 on TB052595-1.

GSAI EMPLOYEE Lisa Mayfield DATE: 5/31/95

☒ 8 HNO3 ☒ 20 HCL ☐ H2SO4 ☐ NAOH ☒ 14 Na2S2O3 ☒ 20 NEAT ☐ OT/PRE.

(Water Only)

20 ~~10~~ VOA AA
22 OTHER

20 VOA
_ OTHER

# Cont.	Mtrx.
42	WH
Total 42	

Remaining Samples in Group _____

Project Manager LRM for Lora

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/26/95 9:50

Name/Company Devine Melikian FRM West

Seal broken by

Date 5/27/95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/26/95 9.50

Name/Company Devine Melikian FRM West

Seal broken by

Date 5/27/95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/26/95 9:50

Name/Company Devine Melik — FRM-West

Seal broken by

Date 5/27/95

5409434844

1784-9535-6 5/26/95

Nevine Melikian EC2-99C-935C

ECM WEST INC

7111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

ECC1.31 2 of 3

X

1155-0512-2

LORA DUNLAP 713-69C-4444

GULF STATES ANALYTICAL INC.

6321C ROTHWAY

HOUSTON TX 77040

158

REVISION DATE 4/94

160

D L. Wms 5/27/95

FedEx RECIPIENT'S

QUESTIONS? CALL 800-2[illegible]

5409434866

1784-9535-6 5/26/95

Nevine Melikian EC2-9[illegible]C-935C

ECM WEST INC

7111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

ECC1.31 1 of 3

X

1155-0512-2

LORA DUNLAP 713-69[illegible]4444

GULF STATES ANALYTICAL INC.

6321C ROTHWAY

HOUSTON TX 77040

158

REVISION DATE 4/94

160

D L. Wms 5/27/95

5409434855

FROM 5409434855

1784-9535-6 5/26/95

Nevine Melikian 602-990-9350

[illegible] WEST INC

5111 N SCOTTSDALE RD STE 108

SCOTTSDALE AZ 85250

ECO:31 3 of 3

X

1155-0512-2

LORA DUNLAP 713-690-4444

GULF STATES ANALYTICAL INC.

5310 POTHWAY

HOUSTON TX 77040

X

A 10

REVISION DATE 4/94

160

N. L. Wms 5/27/95

~~164~~ 21 6/30/95 page 2 of 2

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location: NVANG / Site 14

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature) Steve Becker

Courier:

Request for Analysis

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	TPH, Gasoline Range Organics, SW (8015) J538G	Volatiles TCL, Solids OLM01 List (8240) 1178A	Semivolatiles TCL, Soil OLM01 List (8270) 1201E
SB14-5-3.5	05/25/95	0855		X				1	X	X	X
SB14-5-5.5		0900		X				1	X	X	X
SB14-5-9.0		0915		X				1	X	X	X
SB14-FX		0925	X					6	X	X	X

Relinquished by Sampler: (Signature) Steve Becker — Date: 05/25/95 Time: 1600
Relinquished by: (Signature) Steve Becker — Date: 05/25/95 Time: 1600
Relinquished by: (Signature) Steve Becker — Date: 5/26/95 Time: 9:00
Received by: (Signature) FEDEX
Received by: (Signature)
Received by Laboratory: (Signature) Barbara J. Ulm

Remarks: Sales Order #15749

Requested Turnaround: NORMAL

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERM-West
CONTACT: Robin Weesner
PROJECT: RI/FS NVANG
CARRIER: Fedex
1995 MAY 26 AM 9:06
1995 MAY 26 AM 9:34
DATE RECEIVED:
UNPACKED STAMP:
DATE SHIPPED: 5/25/95
UNPACKED BY: Lalania Willian
NUMBER OF KITS RECEIVED: 2
GROUP# ~~16421~~ 16441 B.O.# 6075

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
820	Yes	C Yes	Yes	2°C	22
		B NO	NO		
404	Yes	C Yes	Yes	5°C	28
		B NO	NO		
		C			
		B			

C = COOLER B= BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
MW05-95-2	SV ORG	Bottle was broken when the
~~MW05-95-2~~	~~VOA~~ " "	cooler arrived.
MW05-95-2	VOA	Bottle was broken
MW05-95-2	ICPMT	pH 4 change to pH 2

PRESERVATIVES CHECKED YES ✓ NO _____ SEE ABOVE NOTES _____
(Water only)

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

GSAI EMPLOYEE _____ DATE: _____

[4] HNO3 [13] HCL [ ] H2SO4 [ ] NAOH [11] Na2S2O3 [12] NEAT [ ] OT/PRE.

(Water Only)

26 VOA
2 OTHER

_ VOA
_ OTHER

# Cont.	Mtrx.
41	WA
9	SO
Total 50	

Remaining Samples in Group 5x overlap with Group 16424
16421

Project Manager LRM for Lora

FedEx

5409434811

5409434811

SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER

1784-9535-6

5/25/95

From (Your Name, Phone Number)

Robin Weesner

(602)990-9350

Company

EPM WEST INC

Street Address

9111 N SCOTTSDALE RD STE 108

City

SCOTTSDALE

State

AZ

ZIP Required

8 5 2 5 0

(Recipient's Name, Phone Number, Room, Floor)

LORA DUNLAP

(713)686-44

Company

GULF STATES ANALYTICAL INC.

Exact Street Address (No P.O. Boxes or P.O. Zip Codes)

6310 ROTHWAY

City

HOUSTON

State

TX

ZIP Required

7 7 0 4

YOUR INTERNAL BILLING REFERENCE INFORMATION (First 24 characters will appear on invoice)

ECC1,31 Cooler 2 of 2

IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here

Street Address

City

State

ZIP Required

PAYMENT

Cash/Check

1155-0512-2

SERVICES (Check only one box)

Priority Overnight

OTHER PACKAGING

FEDEX LETTER

FEDEX PAK

FEDEX BOX

FEDEX TUBE

Economy Two-Day

ECONOMY

Freight Service

DELIVERY AND SPECIAL HANDLING

Service

DELIVER WEEKDAY

Total 158

Emp. No.

Date

Cash Received

Street Address

City

State

ZIP

Received By

X

Date/Time Received

FedEx Employee Number

REVISION DATE 4/94

160

L.W 5/24/95

Signature

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/25/95 4:34

Name/Company EM-West Robin Weesner

Seal broken by

Date 5/24/95

L.W 5/25/95

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Dr., Ste. 110
Houston, TX 77092, (713) 690-4444

CUSTODY SEAL

Date/Time 5/25/95 4:37 EM-West

Name/Company Robin Weesner

Seal broken by

Date 5/24/95

GULF STATES ANALYTICAL, INC.

ADDITIONAL
INCONSISTENCIES

16441
~~16421~~ nm

SAMPLE	PARAMETER	INCONSISTENCY
SBH	VDA	The HCl is marked out on the bottle

SAMPLE	PARAMETER	INCONSISTENCY

SAMPLE	PARAMETER	INCONSISTENCY

SAMPLE	PARAMETER	INCONSISTENCY

Validated By _____ Project Manager LRM for Lora

10/92 S.A. 152.05

Grp# 16986

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location:

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature) DAVID BETTS

Courier:

Request for Analysis

#	FIELD SAMPLE ID	Sampling Date	Sampling Time	Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	MS/MSD
1	TB071295-1	7/12/95	—	X					2			X	X		
2	MW28-95-2		1350	X					2			X	X		
3	MW29-95-2		1519	X					2			X	X		
4	MW29-95-2 *		1520	X					2			X	X		
5	MW04-95-2		1640	X					2			X	X		
6	MW04-95-2 *		1641	X					2			X	X		
7	MW05-95-2	7/13/95	0907	X					2			X	X		
8	MW05-95-2 *		0908	X					2			X	X		
9	MW24-95-2		1025	X					2			X	X		
10	MW30-95-2		1120	X					2			X	X		
11	MW32-95-2		1245	X					2			X	X		X
12				X											
13				X											
14				X											

Relinquished by: (Signature) — Date: 7/13/95 — Time: 1530
Received by: (Signature)
Relinquished by: (Signature) — Date: 7/14/95 — Time: 9:45
Received by Laboratory: (Signature)

Remarks: Sales Order #15766

Requested Turnaround: ~~NORMAL~~ 48 HOUR T.A.T.

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.
SAMPLE RECEIPT CHECKLIST

CLIENT: ERMW In | CONTACT: MS. Robin Weesner

PROJECT: RI/FS NV Rng | CARRIER: FedX

DATE RECEIVED: 1995 JUL 14 AM 8:47 | UNPACKED STAMP: 1995 JUL 14 PM 2:18

DATE SHIPPED: 7-13-95 | UNPACKED BY:

NUMBER OF KITS RECEIVED: 1 | GROUP# 16986 B.O.# 16062

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE PRESENT?	CUSTODY TAPE INTACT?	COOLER TEMP	# OF SAMPLE CONTAINERS
	Yes	C NO	NO		22
		B NO	NO		
		C			
		B			
		C			
		B			

C = COOLER B = BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
	"	

PRESERVATIVES CHECKED YES ____ NO ✓ SEE ABOVE NOTES ____
(Water only)

ACTION TAKEN

PERSON CONTACTED: _____ DATE: _____

RESOLUTION _____

GSAI EMPLOYEE _____ DATE: _____

☐ HNO3 ☒ HCL ☐ H2SO4 ☐ NAOH ☐ Na2S2O3 ☐ NEAT ☐ OT/PRE.
(Water Only)

12 VOA
OTHER

VOA
OTHER
82
7-14

# Cont.	Mtrx.
12 82	WA
Total 22	

Remaining Samples in Group 16988

Project Manager _____

0189274002

4171 0189274002

1237-7009-9 7/13/95

DAVID BETTS 713-690-4444 SAMPLE CUSTODIAN 713 690-4444

GULF STATES ANALYTICAL INC

6310 ROTHWAY

HOUSTON TX 77040

GULF STATES ANALYTICAL INC.
6310 ROTHWAY
HOUSTON TX 77040

X

X ←

□

121

7-14-95

REVISION DATE 3/94

158

X

16988

900000

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location:

Project Name: RI/FS NVANG
P.O./Project Number: 6001

Sampler(s) Name: (Signature) DAVID BETZ

Courier:

Request for Analysis

FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0546	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	MS/MSD
1 TB071295-1	7/12/95	—	X					2			X	X		
2 MW28-95-2		1350	X					2			X	X		
3 MW29-95-2		1519	X					2			X	X		
4 MW29-95-2 *		1520	X					2			X	X		
5 MW04-95-2		1640	X					2			X	X		
6 MW04-95-2 *		1641	X					2			X	X		
7 MW05-95-2	7/13/95	0907	X					2			X	X		
8 MW05-95-2 *		0908	X					2			X	X		
9 MW24-95-2		1025	X					2			X	X		
10 MW30-95-2		1120	X					2			X	X		
11 MW32-95-2		1245	X					2			X	X		X
12			X											
13			X											
14			X											

Relinquished by Sampler (Signature) — Date: 7/13/95 — Time: 1520
Relinquished by: (Signature) — Date: 7/14/95 — Time: 8:45
Relinquished by: (Signature) — Date: — Time:
Received by: (Signature)
Received by: (Signature)
Received by Laboratory: (Signature)

Remarks: Sales Order #15766 CLP

Requested Turnaround: ~~NORMAL~~ AS 48 HOUR T.A.T.

Special Detection Limits:

QC Package:

SAMPLE RECEIPT CHECKLIST

CLIENT: ERMW lo — CONTACT: MS. Robin Wagner

PROJECT: RI/FS NV Rng — CARRIER: Fedex

DATE RECEIVED: 1995 JUL 14 AM 8:47 — UNPACKED STAMP: 1995 JUL 14 PM 2:18

DATE SHIPPED: 7-13-95 — UNPACKED BY: [signature]

NUMBER OF KITS RECEIVED: 1 — GROUP# 16986 B.O.# 6062

KIT CHECKLIST

KIT ID	COC PRESENT	CUSTODY TAPE		COOLER TEMP	# OF SAMPLE CONTAINERS
		PRESENT?	INTACT?		
904	Yes	C NO	NO	1°C	22
		B NO	NR		
		C			
		B			
		C			
		B			

C = COOLER B = BOTTLES

INCONSISTENCIES

SAMPLE	PARAMETER	INCONSISTENCY
	"	
	"	

PRESERVATIVES CHECKED YES ___ NO ✓ SEE ABOVE NOTES ___
(Water only)

ACTION TAKEN

PERSON CONTACTED: ___ DATE: ___

RESOLUTION ___

GSAI EMPLOYEE ___ DATE: ___

☐ HNO3 ☒ HCL ☐ H2SO4 ☐ NAOH ☐ Na2S2O3 ☐ NEAT ☐ OT/PRE.
10 7-14 (Water Only)

7-14 16 28 VOA ___ VOA 7-14
___ OTHER ___ OTHER

Remaining Samples in Group 16986

Project Manager NP 7-14

# Cont.	Mtrx.
10 28	WA
10	
Total 28	

000007

S.A. 152.06/April 19, 1995

FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS
QUESTIONS? CALL 800-238-5355 TOLL FREE.

PACKAGE TRACKING NUMBER 0189274002

4171 0189274002

SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER 1237-7009-9

DATE 7/13/95

Sender's Name (Please Print) DAVID BETTS

Phone 713-690-4444

Company GULF STATES ANALYTICAL INC

Exact Street Address 6310 ROTHWAY

City HOUSTON State TX ZIP Required 77040

To (Recipient's Name Please Print) SAMPLE CUSTODIAN

Phone 713 690-4444

Company GULF STATES ANALYTICAL INC.

Exact Street Address 6310 ROTHWAY

City HOUSTON State TX ZIP Required 77040

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice)

If FEDEX LOCATION, Print FEDEX Address Here

State

ZIP

SERVICES

Standard Overnight

FEDEX BOX

DELIVERY AND SPECIAL HANDLING

Check services required

Weekday Service

HOLD AT FEDEX LOCATION

DELIVER SATURDAY

Saturday Service

Special Handling

DANGEROUS GOODS

DRY ICE

Total 121

Date

Ship To Del

Ship To Rec

State

Check

FedEx Employee Number

REVISED DATE 3/94

158

BSC

ERM-West, Inc.

5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 fax (602)990-0107

ERM

Date _____ Weather _____ Page ____ of ____

Chain-of-Custody Record

Job # 6012.12

Job Location Rural NVAAP

Sampler (signature) [illegible]

Printed name [illegible]

Lab Report Recipient [illegible]

Telephone No. 602-990-1350

Receiving Lab [illegible]

Address [illegible], NV

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel)	601/8010 Halogenated Hydrocarbons	602/8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals (RCRA 8 + Ag, Zn)	Other	Number of Containers	Remarks
[illegible]	1215	W	G	40 ml	VOA	X	X	Bailer				X	X					12	24 TAT

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Total Number of Containers:

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
[illegible]	12-20-95	1240				
Company ERM			Company			
Company			Company			

LABORATORY- Please Complete ☐ Samples Intact ☐ Samples at 4°C ☐ Samples not leaking ☐ No. of containers matches C-of-C ☐ Cooler seals intact

Lab sample custodian Signature Date Time

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C of C • Rev 8 • 1/95

Billing Information:

Name _____

Address _____

City, State, Zip _____

Phone Number _____

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21
Sparks, Nevada 89431
Phone (702) 355-1044
Fax (702) 355-0406

Page # _____ of _____

Client Name	ERM WEST	P.O. #	6012-12-00-000-511
Address	1777 Botelho Dr. Suite 260	Phone #	(602) 990-9350
City, State, Zip	Walnut Creek CA 94596	Report Attention	Robin Wessner

Time Sampled	Date Sampled	Type* See Key Below	Lab ID Number	Sample Description	Number of Containers	Analyses Required: TPH 6015	Analyses Required: BTXE	Remarks
	6/20	AQ	ERM062095-01	Baker TANK P4211	3	X	X	24 HOUR
	6/14	✓	TB	TRIP Blank	1			

Sampled by

	Signature	Print Name	Company	Date	Time
Relinquished by	Richard J. Burns	RICHARD J. BURNS	ERM ENVIRONMENTAL WEST	6-20-95	1240
Received by	Tammy Bruce	TAMMY BRUCE	Alpha Analytical	6 20-95	1240
Relinquished by					
Received by					
Relinquished by					
Received by					

E- S ...s are ...rded ...s all ...lls a... ...rded ...lthe ...ner ...re m... ...azar... amp... be n... ...d lo c... r dis... of at ...xpe...

1 of 2

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Field QC

Company: ERM-West, Inc.
Phone No: 602-990-9350
Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner
Project Location:

Project Name: RI/FS NVANG
P.O./Project Number: 6001.31

Sampler(s) Name: (Signature)

Courier: hand delivered

Relinquished by: (Signature) — Date: 05/15/95 — Time: 0747

Relinquished by Sampler: (Signature)

Relinquished by: (Signature)

Received by: (Signature)

Received by Laboratory: (Signature)

Request for Analysis

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	TSS PP Bkt
1	mw17-95-2	05/12/95	0925	X					1						X
2	mw15-95-2	05/12/95	1140	X					1						X
3	mw18-95-2	05/12/95	1305	X					1						X
4	mw18-95-2*	05/12/95	1305	X					1						X
5	mw26-95-2	05/12/95	1435	X					1						X
6	mw26-95-2*	05/12/95	1436	X					1						X
7				X											
8	mw27-95-2	05/13/95	0905	X					1						X
9	~~mw27~~/mw mw08-95-2	05/13/95	0955	X					1						X
10	mw06-95-2	05/13/95	1100	X					1						X
11	mw06-95-2*	05/13/95	1100	X					1						X
12	mw25-95-2	05/13/95	1335	X					1						X
13	mw07-95-2	05/13/95	1435	X					1						X
14	mw07-95-2*	05/13/95	1436	X					1						X

Remarks: Sales Order #15766

Requested Turnaround: NORMAL Rush

Special Detection Limits:

QC Package:

GULF STATES ANALYTICAL, INC.
6310 Rothway
Houston, TX 77040, (713) 690-4444, FAX (713) 690-5646

Field GC

Company: ERM-West, Inc.

Phone No: 602-990-9350

Fax No: 602-990-0107

Reports Sent To: Ms. Robin Weesner

Project Location:

Project Name: RI/FS NVANG

P.O./Project Number: 6001.31

Sampler(s) Name: (Signature)

Courier:

Relinquished by Sampler: (Signature)

Relinquished by: (Signature)

Relinquished by: (Signature)

Date: 5/15/95

Time: 0747

Received by: (Signature)

Received by: (Signature)

Received by Laboratory: (Signature)

Request for Analysis

	FIELD SAMPLE ID	Sampling Date	Sampling Time	Matrix: Water	Soil	Sludge	Oil	Other	# of Containers	Lead by Flame AA (7420) 0255B	TPH, Gasoline Range Organics (8015) 0548G	Purge Aromatics/Halocarbons, GC (8010/8020) 0515	Volatiles, Priority Pollutant (8240) 0522	Semivolatiles TCL, SOW OLM01 List (8270) 0923E	EDB/DBCP
1	MW23-95-2	05/14/95	1045	X					1						X
2	MW03-95-2	05/14/95	1200	X					1						X
3	MW10-95-2	05/14/95	1315	X					1						X
4	MW10-95-2*	05/14/95	1316	X					1						X
5				X											
6				X											
7				X											
8				X											
9				X											
10				X											
11				X											
12				X											
13				X											
14				X											

Remarks: Sales Order #15766

Requested Turnaround: ~~NORMAL~~ Rush

Special Detection Limits:

QC Package:

ERM-West, Inc.

11 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 65250 • (602)990-9350 fax (602)990-0107

ERM

Date 8-21-95 Weather Partly Cloudy/Hot Page 1 of 1

Chain-of-Custody Record

Job # 6001.32
Job Location Reno/NUANG
Sampler (signature) Frank Lamphere
Printed name Frank Lamphere
Lab Report Recipient Ms Robin Leesner
Telephone No. 714-258-8610
Receiving Lab Quanterra Analytical
Address 1721 South Grand Ave.
Santa Ana, CA 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) JP-4	601/ 8010 Halogenated Hydrocarbons	602/ 8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7420 Lead, Total	Other	Number of Containers	Remarks
TB082195-1	—	W		40mL	vial	X	HCL	—			X	X						1	Trip Blank
MW15-95-3	15:05	W	G	40mL 1L 500mL	vial bottle bottle	X	HCL HNO_3	Disposable Bailer	X	X	X	X		X		X		8	
MW18-95-3	16:00	W	G	"	"	X	"	"	X	X	X	X		X		X		8	

F. Lamphere F. Lamphere

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Fedex Total Number of Containers: 17

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
Frank Lamphere	8/22/95		Virginia Luna	8/23/95	10:30	419301980
Company ERM-West			Company Quanterra			
Company			Company			

LABORATORY- Please Complete ☐ Samples Intact ☐ Samples at 4°C ☐ Samples not leaking ☐ No. of containers matches C-of-C ☐ Cooler seals Intact

Lab sample custodian Signature Date Time

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C of C - RYK - Rev 3 Word 6.0

ERM-West, Inc.

5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 fax (602)990-0107

ERM

Date 8-22-95 Weather Cloudy, warm Page 1 of 1

Chain-of-Custody Record

Job # 6001.32

Job Location Reno/NVANG

Sampler (signature) Frank Lamphere

Printed name Frank Lamphere

Lab Report Recipient Ms Robin Weesner

Telephone No. 714-258-8610

Receiving Lab Quanterra Analytical

Address 1721 South Grand Ave

Santa Ana, CA 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) JP-4	601/8010 Halogenated Hydrocarbons	602/8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7420 Total Lead	Other	Number of Containers	Remarks
TB082295-1		W		40mL	vial	X	HCl				X	X						1	Trip Blank
MW30-95-3	9:00	W	G	40mL 1L Stretch	Vial & Bottle	X	HCl Nitric	BAILER	X	X	X			X		X		8	
MW32-95-3	10:15	W	G	"	"	X	"	"	X	X	X			X		X		8	
MW24-95-3	11:32	W	G	"	"	X	"	"	X	X	X			X		X		8	
MW26-95-3	13:55	W	G	"	"	X	"	"	X	X	X			X		X		8	
MW27-95-3	15:05	W	G	"	"	X	"	"	X	X	X			X		X		8	
MW27-95-3X	15:06	W	G	"	"	X	"	Hand	X	X	X			X		X		8	
MW23-95-3	16:25	W	G	"	"	X	"	Hand	X	X	X			X		X		8	

Collection

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Fed Ex Total Number of Containers: 57

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
Frank Lamphere	8-22	17:30	Virginia Luna	8/23/95	10:30	419301916S & 419301917G
Company ERM-West			Company Quanterra			
Company			Company			

LABORATORY-Please Complete ☐ Samples Intact ☐ Samples at 4°C ☐ Samples not leaking ☐ No. of containers matches C-of-C ☐ Cooler seals Intact

Lab sample custodian Signature Date Time

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C of C - RVA - Rev. 6 - Word 6

ERM-West, Inc.

5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 fax (602)990-0107

ERM

11403

Date 8-23-95 Weather clear, Hot Page 1 of 1

Chain-of-Custody Record

Job # 6001.32
Job Location Reno NUAP6
Sampler (signature) Frank Jaylor
Printed name Frank Lampher
Lab Report Recipient Robin Weesner
Telephone No. 714-258-3680
Receiving Lab Quanterra Analytical
Address 1721 ~~Santa A~~ S. Grand Ave.
Santa Ana CA 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) — TPH	601/8010 Halogenated Hydrocarbons	602/8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7420 Total Lead	Other	Number of Containers	Remarks
TB082395-1		W	B	40mL		X	HCl				X	X						1	Samples Shipped in 2 Coolers
MW28-95-3	9:30	W	G	40mL 1L 500mL	Glass bottle	X	HCl unpres NO3	Baiker	X	X	X	X		X		X		8	
MW29-95-3	10:50	W	G	"	"	X	N	"	X	X	X	X		X		X		8	
MW29-95-3X	10:51	"	"	"	"	X	"	"	X	X	X	X		X		X		8	
MW02-95-3	12:55	"	"	"	"	X	"	"	X	X	X	X		X		X		8	
MW10-95-3	14:00	"	"	"	"	X	"	"	X	X	X	X		X		X		8	
MW03-95-3	15:05	"	"	"	"	X	"	"	X	X	X	X		X		X		8	
MW04-95-3	16:05	"	"	"	"	X	"	"	X	X	X	X		X		X		8	
		F Jaylor											F Jaylor						

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Fedex Total Number of Containers: 57

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
Frank Jaylor	82395	17:30	Virginia Luna	8/24/95	10:30	419301914 3 & 419301915 4
Company ERM-West			Company Quanterra			
Company			Company			

LABORATORY-Please Complete ☐ Samples Intact ☐ Samples at 4°C ☐ Samples not leaking ☐ No. of containers matches C-of-C ☐ Cooler seals intact

Lab sample custodian Signature Date Time

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM-West, Inc. C-of-C.XLT, Rev. 1.3 03

ERM-West, Inc.

5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 fax (602)990-0107

ERM

(114200)

Date 8-24-95 Weather Warm, Clear Page 1 of 1

Chain-of-Custody Record

Job # 600132

Job Location Reno/NVAAP

Sampler (signature) Frank Lamphere

Printed name Frank Lamphere

Lab Report Recipient Robin Wegner

Telephone No. 714-258-8610

Receiving Lab Quanterra Analytical

Address 1721 South Grand Ave

Santa Ana CA 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) JP4	601/ 8010 Halogenated Hydrocarbons	602/ 8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7420 Total Lead	Other: MS/MSD REQUESTED	Number of Containers	Remarks
MW17-95-3	10:50	W	G	40mL 12 Second	2 1/2 Gallon Bottle	X	HCl pH<2	Bailer	X	X	X	X		X		X		11	
MW05-95-3	12:40	"	"	"	"	X	"	"	X	X	X	X		X		X	X	16	MS/MSD
MW06-95-3	14:15	"	"	"	"		"	"		X	X	X		X		X		8	
MW06-95-3X	14:16	"	"	"	"	X	"	"		X	X	X		X		X		8	

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: FEDEX Total Number of Containers: 43

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
Frank Lamphere	8-24-95	17:00	Virginia Luna	8/25/95	10:30	419301912 1 & 419301913 2
Company ERM-West			Company Quanterra			
Company			Company			

LABORATORY-Please Complete

☑ Samples intact ☑ Samples at 4°C ☑ Samples not leaking ☑ No. of containers matches C-of-C ☑ Cooler seals intact

Lab sample custodian NOEL RUIZ Signature [signature] Date 8/25/95 Time 10:30

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C of C - RYK - Rev. 3

ERM-West, Inc.

5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 fax (602)990-0107

ERM

Date 8-24-95 Weather Clear, Warm Page 1 of 1

Chain-of-Custody Record

Job # 600131

Job Location Pena/NIAWC

Sampler (signature) Frank Jenkins

Printed name Frank Lenkins

Lab Report Recipient Robin Woesner

Telephone No. 714-258-8610

Receiving Lab Quanterra Analytical

Address 1721 South Grand Ave

Santa Ana, CA 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel)	601/8010 Halogenated Hydrocarbons	602/8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7420 Total Lead	Other: CLP Package Requested	Number of Containers	Remarks
TB082495-1	—	W	G	40ml	Vial	X	HCl				X	X						1	Trip Blank
MW3-95-3	8:45	W	G	4 liter amber bottle	Vial, 1 liter amber bottle	X	HCl, None	Bailer		X	X	X		X		X	X	8	CLP Package
MW31-95-3*	8:45	"	"	"	"	X	"	"		X	X	X		X		X	X	8	" "
MW07-95-3	15:45	"	"	"	"	X	"	"	X	X	X	X		X		X	X	11	" "

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Fedex Total Number of Containers: 38

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
Frank Jenkins	8/24/95	17:00	Virginia Luna	8/25/95		4193019121 & 4193019132
Company ERM-West			Company Quanterra		10:30	
Company			Company			

LABORATORY-Please Complete

☒ Samples Intact ☐ Samples at 4°C ☒ Samples not leaking ☒ No. of containers matches C-of-C ☒ Cooler seals Intact

Lab sample custodian Robin Woesner Signature [signature] Date 8/25/95 Time 10:30

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C of C - 8/XX - Rev. 1 Work 03

ERM-West, Inc.

5111 N. Scottsdale Road, Suite 108, Scottsdale, Arizona 85250 • (602)990-9350 fax (602)990-0107

ERM

Date 8-25-95 Weather Sunny, Warm Page 1 of 1

Chain-of-Custody Record

Job # 6001.32

Job Location Reno/NVANG

Sampler (signature) Frank Lamphere

Printed name Frank Lamphere

Lab Report Recipient Robin Weesner

Telephone No. Quanterra Analytical

Receiving Lab 714-258-8610

Address 1721 South Grand Ave

Santa Ana CA 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Collection: Container type	Collection: ICED	Collection: Preservative	Collection: Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) JPX	501/ 8010 Halogenated Hydrocarbons	602/ 8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatils Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7420 Total Lead	Other	Number of Containers	Remarks
TB082595-1		W		40mL	Vial	X	HCl				X	X						1	Trip Blank
MW25-95-3	8:45	W	G	40mL 1L 60mL	Vial Amber bottle	X	HCl H2SO4	Bailer	X	X	X	X		X		X		11	
MW25-95-3X	8:46	"	"	"	"	X	"	"	X	X	X	X		X		X		11	
MWT4-95-3	10:05	"	"	"	"	X	"	"	X	X	X	X		X		X		11	
MWT4-95-3X	10:05	"	"	"	"	X	"	"	X	X	X	X		X		X		11	

Shipped in Two Coolers

	1/2	2/2
CT:	2.8	2.7
TB:	2.7	3.2

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: FedEx Total Number of Containers: 45

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
Frank Lamphere	8-25-95	12:00		8/26/95	10:30	419309106 & 419309110
Company ERM-West			Company Quanterra			
Company			Company			

LABORATORY- Please Complete

☑ Samples Intact ☑ Samples at 4°C ☑ Samples not leaking ☑ No. of containers matches C-of-C ☑ Cooler seals Intact

Lab sample custodian Signature Date 8/26/95 Time 1030

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold ____ days

ERM C of C - R1X - Revised 1/93

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ERM

11,-95 (11.M)

Date 8-22-95 Weather CLEAR, WARM Page 1 of 1

Chain-of-Custody Record

Job # 6001.32

Job Location RENO/NVANG

Sampler (signature) David X. Betts

Printed name DAVID S. BETTS

Lab Report Recipient ROBIN WEESNER

Telephone No. (714) 258-8610

Receiving Lab QUANTERRA ANALYTICAL

Address 1721 S. GRAND AVE.

SANTA ANA, CA. 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) JP-4	601/ 8010 Halogenated Hydrocarbons	602/ 8020 Aromatic Hydrocarbons (BTEX)			624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)			418.1 Tot. Recoverable Petroleum Hydrocarbons			Inorg: Metals	Inorg: 7240 TOTAL LEAD	Other				Number of Containers	Remarks
TB111395-1	—	W	—	80 ml	VOA VIAL	X	HCl	—			X	X																2	TRIP BLANK
MW18-95-4	1448		G	4 L 620 ml	VOA AMBER PLASTIC	X	HCl HNO3	DISP. BAILER		X	X	X				X						X						8	
MW18-95-4*	1449		G	↓	↓	X	↓	↓		X	X	X				X						X						8	

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: FED EX Total Number of Containers: 18

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
David X. Betts	11/13/95	1620	Virginia Luna	11/14/95	10:00	7920525793
Company ERM-WEST			Company Quanterra			
Company			Company			

LABORATORY- Please Complete

☑ Samples intact ☑ Samples at 4°C ☑ Samples not leaking ☑ No. of containers matches C-of-C ☑ Cooler seals intact

Lab sample custodian NOEL RUIZ Signature [signature] Date 11-14-95 Time 10:00

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C.O.C. - R/X - Rev 4 Work 93

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Date 11-14-95 Weather CLEAR, WARM Page 1 of 1

Chain-of-Custody Record

Job #	6CC1.32
Job Location	RENO/NVANG
Sampler (signature)	DAVID S. BETTS
Printed name	David A. Betts
Lab Report Recipient	ROBIN WEESNER
Telephone No.	(714) 258-8610
Receiving Lab	QUANTERRA ANALYTICAL
Address	1721 S. GRAND AVE. SANTA ANA, CA. 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) JP-4	601/8010 Halogenated Hydrocarbons	602/8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7240 TOTAL LEAD	Other	Number of Containers	Remarks
TB111495-1	—	W	—	80 ml	VOA VIAL	X	HCL	—			X	X						2	SAMPLES SHIPPED IN TWO (2) COOLERS
MW15-95-4	0835	W	G	4 L 60 ml	AMBER GLASS	X	HCL HNO3	DISP. BAILER		X	X	X		X		X		8	115954
MW17-95-4	0935	"	"	"	"	X	"	"		X	X	X		X		X		8	
MW30-95-4	1030	"	"	"	"	X	"	"		X	X	X		X		X		8	
MW08-95-4	1325	"	"	"	"	X	"	"		X	X	X		X		X		8	MS/MSD
MW27-95-4	1425	"	"	"	"	X	"	"		X	X	X		X		X		8	
MW32-95-4	1530	"	"	"	"	X	"	"		X	X	X		X		X		8	
MW30-95-4*	1031	"	"	"	"	X	"	HAND		X	X	X		X		X		8	

0345

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Total Number of Containers: 58

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
David A Betts	11/14/95	1610	Virginia Luna	11/16/95	10:30	FED EX 792052580 4
Company ERM-WEST			Company Quanterra			792052581 5
Company			Company			

LABORATORY-Please Complete ☐ Samples Intact ☐ Samples at 4°C ☐ Samples not leaking ☐ No. of containers matches C-of-C ☐ Cooler seals Intact

Lab sample custodian Signature Date Time

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

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Date 11-15-95 Weather CLOUDY, WARM Page 1 of 1

Chain-of-Custody Record

Job # 6001.32

Job Location RENO / NVANG

Sampler (signature) David A. Betts

Printed name DAVID S. BETTS

Lab Report Recipient ROBIN WEESNER

Telephone No (714) 258-8610

Receiving Lab QUANTERRA ANALYTICAL

Address 1721 S. GRAND AVE.

SANTA ANA, CA. 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) JP-4	601/ 8010 Halogenated Hydrocarbons	602/ 8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7240 TPH LEAD	Other	Number of Containers	Remarks
TB111595-1	—	W	—	80 ml	VOA VIAL	X	HCl	—			X	X						2	SAMPLES SHIPPED IN TWO (2) COOLERS
MW26-95-4	0826		G	4 L 620 ml	VOA AMBER PLASTIC		HCl HNO3	DISP. BAILER		X	X	X		X		X		8	
MW26-95-4#	0837							HAND		X	X	X		X		X		8	
MW24-95-4	0941							DISP. BAILER		X	X	X		X		X		8	
MW23-95-4	1115									X	X	X		X		X		8	
MW29-95-4	1333									X	X	X		X		X		8	
MW28-95-4	1421									X	X	X		X		X		8	
MW04-95-4	1512									X	X	X		X		X		8	

DSB

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Total Number of Containers: 58

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
David A. Betts	11/15/95	1550	Virginia Luna	11/16/95	10:30	792052583O
Company			Company Quanterra			7920525841
Company			Company			

LABORATORY-Please Complete ☐ Samples intact ☐ Samples at 4°C ☐ Samples not leaking ☐ No. of containers matches C-of-C ☐ Cooler seals intact

Lab sample custodian | Signature | Date | Time

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C of C • RVK • Reno • Word 13

(115997)

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Date 11-16-95 Weather CLOUDY WARM Page 1 of 2

Chain-of-Custody Record

Job # 6001.32

Job Location RENO/NEVADA

Sampler (signature) David A. Betts

Printed name DAVID S. BETTS

Lab Report Recipient ROBIN WEESNER

Telephone No. (714) 258-8610

Receiving Lab QUANTERRA ANALYTICAL

Address 1721 S. GRAND AVE.

SANTA ANA, CA. 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) VPH	601/8010 Halogenated Hydrocarbons	602/8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals 7240 TOTAL LEAD	Other	Number of Containers	Remarks
~~TBHH095-1~~	—	~~W~~	—	~~40 ml~~	~~VOA~~	~~X~~	~~HCL~~	QSB			~~X~~	~~X~~	D.S.B.					~~2~~ D.S.B.	
MW03-95-4	0910	W	G	4 L 600 ml	VOA AMBER & PLASTIC		HCL AMBER	DISP. BAILER		X	X	X		X		X		8	
MW03-95-4*	0911							HAND		X	X	X		X		X		8	
MW10-95-4	1104							DISP. BAILER		X	X	X		X		X		8	
MW10-95-4*	1105							HAND		X	X	X		X		X		8	
MW05-95-4	1415							DISP. BAILER		X	X	X		X		X		8	
MW05-95-4*	1416									X	X	X		X		X		8	
MW07-95-4	1515									X	X	X		X		X		8	
						D.S.B.													

SHIPPED IN TWO (2) COOLERS

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Total Number of Containers: 58

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
David A. Betts	11/16/95	1620	[illegible]	11/17/95	10:30	792052603 6
Company ERM-WEST			Company QES-SA			792052602 5
Company			Company			

LABORATORY-Please Complete: ☑ Samples intact ☑ Samples at 4°C ☑ Samples not leaking ☑ No. of containers matches C-of-C ☑ Cooler seals intact

Lab sample custodian NOEL RUIZ Signature [signature] Date 11/17/95 Time 10:30

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold ____ days

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Date 11-16-95 Weather CLOUDY WARM Page 2 of 2

Chain-of-Custody Record

Job #	6001.32
Job Location	RENO/NVANG
Sampler (signature)	David S. Betts
Printed name	DAVID S. BETTS
Lab Report Recipient	ROBIN WEESNER
Telephone No	(714) 258-8610
Receiving Lab	QUANTERRA ANALYTICAL
Address	1721 S. GRAND AVE.
	SANTA ANA, CA. 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel)	601/ 8010 Halogenated Hydrocarbons	602/ 8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals	Inorg: CLP TAL Metals	Other	Number of Containers	Remarks
MW31-95-4	1013	W	G	4L 620ml	VOA AMBER PLASTIC	X	HCL HNO3	DISP. BAILER		X	X	X		X			X		8	CLP VALIDATION REQUESTED
MW16-95-4	1332					↓	↓	↓		X	X	X		X			X		8	SHIPPED IN TWO (2) COOLERS
TB111695-1	—	W	—	80ml	VOA	↓	HCL	—			X	X							2	

DES

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Total Number of Containers: 18

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
David S. Betts	11/16/95	1620		11/17/95	10:30	792052603 6
Company ERM-WEST			Company QES-SA			792052602 5
Company			Company			

LABORATORY- Please Complete

☑ Samples Intact ☑ Samples at 4°C ☑ Samples not leaking ☑ No. of containers matches C-of-C ☑ Cooler seals Intact

Lab sample custodian	Signature	Date	Time
NOEL RUIZ		11/17/95	1030

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold _____ days

ERM C of C - 1 • White • Yellow • Pink

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Date 11-17-95 Weather CLEAR, WARM Page 1 of 1

Chain-of-Custody Record

Job # 6001.32

Job Location RENO/NVANE

Sampler (signature) Dan A. Betts

Printed name DAVID S. BETTS

Lab Report Recipient ROBIN WEESNER

Telephone No (714) 258-8610

Receiving Lab QUANTERRA ANALYTICAL

Address 1721 S. GRAND AVE.

SANTA ANA, CA. 92705

Sample ID#	Time	W=water S=soil	C=comp G=grab	Volume	Container type	ICED	Preservative	Sampling Method	8015M Purgeables (Gasoline)	8015M Extractables (Diesel) TPH-4	601/8010 Halogenated Hydrocarbons	602/8020 Aromatic Hydrocarbons (BTEX)	624-8240 Purgeables (Volatile Organics)	625-8270 BNAs & Pest. (Semivolatile Organics)	418.1 Tot. Recoverable Petroleum Hydrocarbons	Inorg: Metals TCLP TOTAL LEAD	Other	Number of Containers	Remarks
TB111795-1	—	W	—	80 ml	VOA	X	HCL	—			X	X						2	116019
MW25-95-4	0845	W	G	4L 620 ml	VOA AMBER PLASTIC	X	HCL HNO3	DISP. BAILER		X	X	X		X		X		8	
~~MW-DSB~~																			
T4-95-2	0930	W	G	4L 240 ml	VOA AMBER PLASTIC	X	HCL HNO3	DISP. BAILER		X	X	X		X		X		16	MS/MSD

DSB

Precautions: Conc: Lo ☐ Med ☐ Hi ☐ Ship Via: Total Number of Containers: 26

Sample Relinquished By	Date	Time	Received By	Date	Time	Reason for Transfer (List Shipping Bill Number)
Dan A. Betts	11/17/95	1130		11/18/95	1000	7920525852
Company ERM-WEST			Company QUANTERRA			
Company			Company			

LABORATORY-Please Complete: ☑ Samples Intact ☑ Samples at 4°C ☑ Samples not leaking ☑ No. of containers matches C-of-C ☑ Cooler seals Intact

Lab sample custodian NOEL RUIZ Signature [signature] Date 11/18/95 Time 10:00

Sample Disposition ☐ Return to Site ☐ Discard ☐ Hold ____ days

ERM C of C - RYK • Rondo & Work 12

APPENDIX F

LOCATIONS OF REPOSITORIES OF ANALYTICAL DATA AND QUALITY ASSURANCE/QUALITY CONTROL EVALUATION RESULTS

APPENDIX F

Copies of the original laboratory data and ERM's data validation reports are available for public examination at three storage repositories. The repository location, address, and appropriate contact persons are listed below:

Repository Location	Address	Contact Person, Phone Number, and Facsimile Number
Nevada Air National Guard Base, Reno, Nevada	1776 National Guard Way Reno, Nevada 89502-4494	Major John Peck Phone: 702-788-4503 Facsimile: 702-788-4797
Nevada Department of Conservation and National Resources, Division of Environmental Protection	Capitol Complex Carson City, Nevada 89710	Mr. Arthur G. Gravenstein Phone: 702-687-4670 (Extension 3032) Facsimile: 702-885-0868
Air National Guard /CEVR/HQ	Building R-47 3500 Fetchet Avenue Andrews Air Force Base, Maryland 20762	Mr. Michael Frey Phone: 301-836-8903 Facsimile: 301-836-8121

APPENDIX G

INVESTIGATION DERIVED WASTE MANAGEMENT

TABLE G-1

Investigation Derived Waste Recommendations - Soil Matrix
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Well/Boring Location	Soil Analysis Performed?	Maximum TPH Concentration, mg/kg	Maximum PID Reading, ppm	Recommendation	Comments
SB7T-1	No	NA	522	Lockwood Landfill	Encountered free product during drilling
SB7T-2	No	NA	283	Lockwood Landfill	Encountered free product during drilling
SB7T-3	No	NA	2135	Lockwood Landfill	Encountered free product during drilling
SB7T-4	No	NA	763	Lockwood Landfill	Encountered free product during drilling
MW28	No	NA	0.0	Disposal on Base	In the vicinity of boreholes with no TPH detections (SB4-2, SB4-3, SB4-4)
MW29	No	NA	0.1	Disposal on Base	In the vicinity of boreholes with no TPH detections (SB4-2, SB4-3, SB4-4)
MW30	No	NA	0.0	Disposal on Base	TPH detection in SB5-2
MW31	No	NA	0.0	Disposal on Base	No TPH detection in SB7-4 (closest borehole to MW31)
MW32	No	NA	0.0	Disposal on Base	Upgradient of Site 5
SB4-1	Yes	ND		Disposal on Base	
SB4-2	Yes	ND		Disposal on Base	
SB4-3	Yes	3.42		Disposal on Base	
SB4-4	Yes	ND		Disposal on Base	
SB4-5	Yes	1400		Lockwood Landfill	
SB4-6	Yes	192		Lockwood Landfill	
SB4-7	Yes	ND		Disposal on Base	
SB5-1	Yes	ND		Disposal on Base	
SB5-2	Yes	288		Lockwood Landfill	
SB5-3	Yes	ND		Disposal on Base	
SB5-4	Yes	ND		Disposal on Base	
SB7-1	Yes	1000		Lockwood Landfill	
SB7-2	Yes	560		Lockwood Landfill	
SB7-3	Yes	222		Lockwood Landfill	
SB7-4	Yes	ND		Disposal on Base	
SB7-5	Yes	1010		Lockwood Landfill	Encountered free product during drilling
SB7-6	Yes	4.31		Disposal on Base	
SB7-7	Yes	5520		Lockwood Landfill	
SB7-8	Yes	40.8		Disposal on Base	
SB7-9	Yes	3.58		Disposal on Base	
SB7-10	Yes	170		Lockwood Landfill	
SB7-11	Yes	908		Lockwood Landfill	
SB7-12	Yes	ND		Disposal on Base	
SB14-1	Yes	ND		Disposal on Base	
SB14-2	Yes	ND		Disposal on Base	
SB14-3	Yes	2500		Lockwood Landfill	
SB14-4	Yes	ND		Disposal on Base	
SB14-5	Yes	ND		Disposal on Base	

PID = Photoionization Detector
TPH = Total Petroleum Hydrocarbons
mg/kg = milligrams per kilogram
ppm = parts per million

TABLE G-2

Investigation Derived Waste Recommendations - Water Matrix
152nd Tactical Reconnaissance Group, NVANG, Reno, Nevada

Well Location	Waste Type	Recommendation	Comments
MW28	Development Water and Purge Water	Discharge to Sanitary Sewer	
MW29	Water and Purge Water	Discharge to Sanitary Sewer	
MW30	Development Water and Purge Water	Discharge to Sanitary Sewer	
MW31	Development Water and Purge Water	Discharge to Sanitary Sewer	
MW32	Water and Purge Water	Discharge to Sanitary Sewer	
MW03	Purge Water	Discharge to Sanitary Sewer	
MW04	Purge Water	Discharge to Sanitary Sewer	
MW05	Purge Water	Romic Chemical Company*	Trichloroethylene and benzene concentrations exceed MCLs
MW17	Purge Water	Romic Chemical Company	Benzene concentraitons exceed MCLs
MW10	Purge Water	Discharge to Sanitary Sewer	
MW06	Purge Water	Romic Chemical Company	Benzene concentrations exceed MCLs
MW07	Purge Water	Romic Chemical Company	Benzene and bis(2-ethylhexl)phthalate concentrations exceed MCLs
MW25	Purge Water	Romic Chemical Company	Benzene and bis(2-ethylhexl)phthalate concentrations exceed MCLs
MW31	Purge Water	Discharge to Sanitary Sewer	
MW23	Purge Water	Discharge to Sanitary Sewer	
MW24	Purge Water	Discharge to Sanitary Sewer	
MW15	Purge Water	Discharge to Sanitary Sewer	
MW18	Purge Water	Discharge to Sanitary Sewer	
T-4	Purge Water	Romic Chemical Company	Benzene, bis(2-ethylhexl)phthalate, and toluene concentrations exceed MCLs

* = Off-site transport and treatment. Recommend bulk shipment option. Romic can transfer contents of existing drums into one tank for transport.

MCL = maximum contaminant levels